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PENNSYLVANIA DEPARTMENT OF FORESTRY

STATE FOREST ACADEMY



Bulletin 8

TENTH ANNIVERSARY 1903-1913



HARRISBURG, PA.:
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1913.

PENNSYLVANIA DEPARTMENT OF FORESTRY

ROBERT S. CONKLIN,
Commissioner of Forestry

IRVIN C. WILLIAMS,
Deputy Commissioner of Forestry

STATE FORESTRY RESERVATION COMMISSION

ROBERT S. CONKLIN, *President*

JOSEPH T. ROTHROCK

MIRA LLOYD DOCK

SIMON B. ELLIOTT

J. LINN HARRIS



A CROP WORTH GROWING.
Forestry Grown White Pine—13 Years and 58 Years Old.
500 to 800 Board Feet Per Acre Per Year.

FOREWORD.

The Pennsylvania Department of Forestry is undertaking the huge task of restoring the forests of the State to their original productive condition when they yielded abundant revenue to the owners, steady work for the laboring men, and healthful living conditions to all through their pure water supply, stream regulation, and prevention of erosion. To develop the one million acres of forest land purchased by the State trained foresters were needed and since no institution in the State could or would furnish them, the State Forest Academy was organized ten years ago.

The following tenth anniversary announcement is made to the people of Pennsylvania to inform them of the past progress and present standing of the school and to bespeak their hearty cooperation in the very urgent restoration of the forests of the State. It is not an extravagant claim to say that the health and prosperity of the entire State hinge on the success or failure of this movement.

THE FACULTY.

EDWIN ALLEN ZIEGLER, A. M.,
Director and Professor of Forestry.

JOSEPH SIMON ILLICK, A.B., B.F.,
Professor of Forestry.

GEORGE AUSTIN RETAN, B. F.,
Professor of Forestry.

WILLIAM NETOFFSKY, B. S. in CH.,
Professor of Chemistry

JOHN CLINTON ADAMS, B. S.,
Professor of Biology.

RECENT LECTURERS.

Dr. J. T. Rothrock, former Commissioner of Forestry and
present Member of the Pennsylvania State Forestry Reserva-
tion Commission.

S. T. Dana, United States Forest Service.

Hon. S. B. Elliott, Member of the Pennsylvania State Forestry
Reservation Commission.

J. Horace McFarland, President American Civic Association.

C. J. Blanchard, United States Reclamation Service.

Mira L. Dock, Member of the Pennsylvania State Forestry
Reservation Commission.

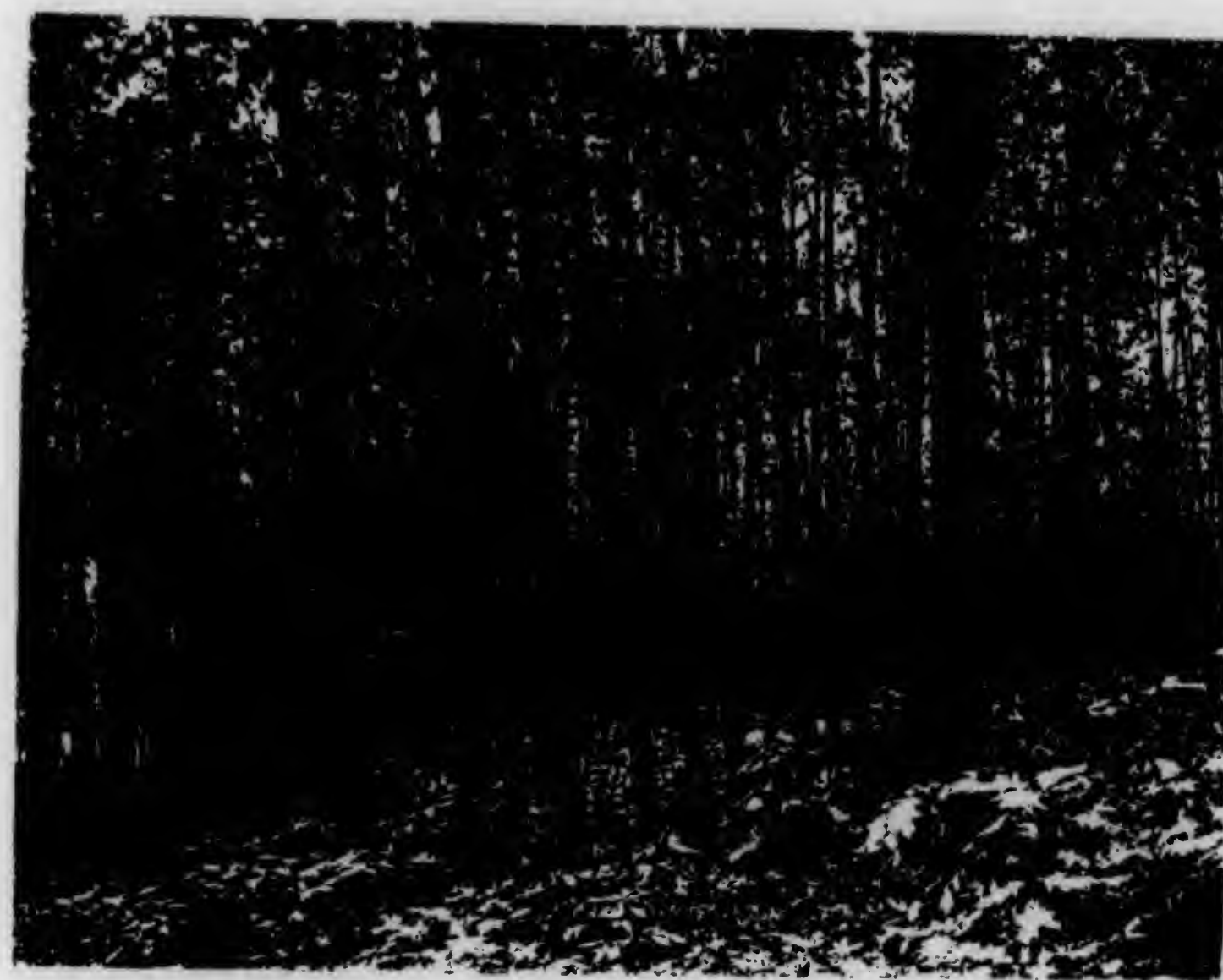
William L. Hall, United States Forest Service.

Dr. Marion Mackenzie, Professor of Biology, Temple College.

George H. Wirt, Forest Inspector, Pennsylvania State Forest
Service.

Dr. John W. Harshberger, Professor of Botany, University of
Pennsylvania.

Dr. Richard C. Scheidt, Professor of Biology, Franklin & Mar-
shall College.



A YOUNG HARDWOOD FOREST UNDER FOREST MANAGEMENT.
Each acre produces $\frac{1}{2}$ to 1 cord of timber each year.

ORIGIN AND DEVELOPMENT.

As early as 1876, in an address before the recently organized American Forestry Association at Philadelphia, Burnett Landreth pointed out the necessity of teaching Forestry as a science in itself and not as a branch of Agriculture. From that time, throughout the period of agitation and public education which preceded the foundation of the Department of Forestry there continued frequent references to the necessity of such a separate course or, better still, of a separate school devoted to the teaching of Forestry. Most of the ideas expressed were based on the European Forest Schools as models but all recognized the necessity of adapting such a school to American needs and conditions. This agitation was especially strong in the years 1888 and 1889. During 1889 the trustees of the University of Pennsylvania established a chair of Forestry to be filled as soon as funds became available, but the chair was never filled.

Public sentiment in favor of forestry was of slow growth particularly among forest owners. Recognizing that this condition must first be remedied by educational work, it was seen that the time was not yet ripe for a technical forest school. So the talk of the necessity of forestal education was not strong until about the year 1900.

In issues of "Forest Leaves," in 1901 and 1902, are found several articles dwelling on the necessity of trained men to do forestry work upon the large areas of land which were rapidly passing into the control of the Forestry Department. Dr. J. T. Rothrock, then Commissioner of Forestry, took the lead in this movement. Endeavors were made to have scientific courses added to the University of Pennsylvania or to Pennsylvania State College. These schools refused at that time to undertake the work. Ap-

precipitating the actual need of men and realizing the great advantages of a practical school connected with actual forest work, Dr. Rothrock decided to establish such a school under the control of the Department of Forestry and locate it upon a State reserve. In the spring of 1902 the State Forester, Mr. George H. Wirt, a Biltmore graduate, was sent to Mont Alto to take charge of the property recently purchased from the Mont Alto Iron Company, and establish a forest nursery. Although the legislature of 1901 had refused to adopt Dr. Rothrock's plans, he felt sure that two years would find a change in sentiment, and, as a preliminary measure, four young men, Ralph E. Brock, Charles Delaney, Robert G. Conklin, and Harvey E. Frankenhof were sent to help Mr. Wirt and get some instruction in Forestry. In January, 1903, a German forester, Paul E. Arnold, of Tharandt, was added to the force. By act of May 13, 1903, the school was formally recognized and plans were made for the entrance of the first class. Previously the Commission formally adopted, on June 4, 1902, the curriculum and plan of work submitted by Mr. Wirt for his forest school.

The original idea was that the students admitted should be composed of young men from the wooded districts with practical woods experience and the first class was partly composed of such men, appointed by the Commissioner of Forestry. It was soon recognized that these men were often unable to do the mental work required in a study of scientific forestry and the entrance requirements were made strictly competitive with both **physique** and mental ability entering into the test. This plan has been constantly adhered to since that time.

At first there was some thought of moving the school to the Caledonia purchase as possessing better facilities, but this was finally given up and the administrative buildings of the old furnace at Mont Alto were utilized for the school. These were

far from being ideal and the school was handicapped for some years until in 1908 the first of our modern buildings was erected. Along with the development in material equipment has gone a constant progression in the standard required for entrance and for graduation, until the course has attained its present degree of completeness.

LOCATION.

The Pennsylvania State Forest Academy is located about one mile from Mont Alto, a small village in Franklin County, which is sixty miles southwest of Harrisburg on the Cumberland Valley Railroad. The school is located at the base of the west slope of the South Mountain ridge of the Blue Mountains. The ground occupied by the school buildings is a part of a State forest which affords an opportunity for practical instruction and experimentation equalled by few if any forestry schools. The situation is healthful and the school is supplied with water from a spring located in the interior of the forest. To the west of the school lies the Cumberland Valley which is regarded one of the garden spots of Pennsylvania.

The location of the school stands in strong contrast with those in the larger cities. Such an isolated location has a few disadvantages, recompensed however, by many advantages which make it not only more attractive for study but which allow the students to study things rather than about things.

BUILDINGS AND EQUIPMENT.

The oldest building of the academy group is Wiestling Hall, a large three-story structure, at one time the residence of Colonel George B. Wiestling, a member of the first Forestry Commission of Pennsylvania. The building has recently been remodeled and is used as an administration building.

The main building, constructed of native quartzite, was erected in 1908-1909, at a cost of \$30,000.00. On the second floor of this building are comfortable living rooms for all of the students, and for two of the instructors. The whole of the first floor is devoted to class rooms, laboratories, and the library. A part of the basement is also used as a Wood Technology room and contains the collection of wood specimens. There is a complete steam heating equipment and the building is furnished with the necessary toilet rooms and lavatories.

In 1911 a double cottage, now occupied by the Director and another member of the faculty, was built. Another cottage in the academy group is occupied by the forester stationed upon this reserve.

The horses of the junior and senior classes are stabled in a well arranged barn.

Walks and drives have been carefully laid out by a landscape architect, and the buildings are surrounded by spacious lawns which are dotted with many trees and shrubs.

PURPOSE.

The purpose of the Pennsylvania State Forest Academy is to prepare thoroughly trained foresters for the service of the State in its forests. The duties of a forester in the employ of the State require a thorough training and apprenticeship in actual woods work, besides the usual school studies in forestry, the sciences, and a number of cultural subjects. The forester must have an equipment covering the surveying and mapping of his forest; the growing of trees and their proper management from planting, through thinning, to final logging and sawing; the protection of the forest from its arch-enemy, the forest fire, as well as from insects, disease, and trespass; the building and improvement of the forest roads, trails, fire-lines, telephone



FORESTRY STUDENTS PLANTING TREES.

An acre of land is planted with 1,200 trees at a cost, including trees, of \$6 to \$9.

lines, and fire towers; the estimate of timber and the calculation of its growth, value, and financial returns, the directing of labor; the keeping of records and accounts; and some knowledge of business and forest law. This requires an underlying training in mathematics, botany, zoology, chemistry and geology, as well as history, language, and economics.

The practical application of this training is the large feature of the school, for the entire course may be said to be given in the 25,000 acres of State forest in which the school is located. All the activities of the forester are followed in the woods from the growing of trees from seed in the nursery attached, to the grinding of the forest student's own axe, the cutting of undesirable trees into cordwood, and the mature trees into saw-logs, as well as their manufacture into lumber, lath, and shingles on the school mill; from the day and night fighting of forest fires and the pick and shovel building of roads to the construction of a thorough plan of forest management for a large tract of forest land.

The students return to the State in the form of this labor in the forest a considerable part of the expense incurred in their training. In greater efficiency and enthusiasm in their forest work afterward the State becomes their debtor.

ADMINISTRATION.

The State places on the Commissioner of Forestry, advised by the Forestry Reservation Commission, the responsibility for the carrying on of the school. The immediate charge is placed in the hands of a director and four other instructors, all of whom have enjoyed special training in their respective fields of instruction.

DEGREE.

The degree of Bachelor of Forestry is conferred after the successful completion of the course.

ENTRANCE REQUIREMENTS.

WHO MAY BE ADMITTED? Only citizens of Pennsylvania who are 19 years of age and under 25 on the first day of September, in the year in which the applicant is admitted.

THE PROSPECTIVE STUDENT must make application on a form to be furnished by the Commissioner of Forestry, which will be sent him about one month prior to the date of the examination, and after he has made application by letter to receive the same. The blank form furnished by the Commissioner of Forestry will contain a form of physician's certificate, to be filed with the application.

EXAMINATIONS FOR ADMISSION: These consist of an additional physical examination made by the Department's physicians and a test in scholarship. The examinations will be held during the latter part of June in the city of Harrisburg, and usually occupy two full days. If the physical examination of the applicant discloses satisfactory conditions, he is admitted the following day to the examination in scholarship, which covers the following high school branches: Reading, writing, arithmetic, spelling, United States history, English grammar and composition, physical and commercial geography, physiology, algebra (to and including pure and affected quadratic equations), plane and solid geometry, and civil government. Unless otherwise indicated, the examination will cover the whole subject. No copies of prior examination papers will be furnished.

PRACTICAL EXPERIENCE: As a result of the mental and physical examinations and the report of the examiners to the

Commissioner of Forestry, the fifteen men standing first in the group of those examined will be assigned to Pennsylvania foresters on State forests for practical work and instruction, during a period of two months, beginning about July first. At the end of this period the fifteen men so selected will assemble at the Department of Forestry where they will be subjected to an additional test on practical work in the woods. As a result of this test, ten men of the group who pass the best examination in practical work will be nominated by the Commissioner of Forestry for admission to the Forest Academy on the following September first. Applicants will bear their own expenses while in the reserve for the two-month period.

CONTRACT AND BOND: Each successful applicant receiving an appointment must enter into a contract with the Commonwealth of Pennsylvania for the proper fulfilment of his duties at the Forest Academy during the full course of three years, and then that he will enter the employ of the State after graduation and remain there for a further period of three years as a forester. He must also furnish with his contract a bond in the sum of \$500 with sureties to be approved by the Commissioner of Forestry, conditioned that he will faithfully execute his contract. Sureties, if individuals, must be two in number, and show fee simple ownership of Pennsylvania real estate with an equity above all incumbrances of at least the amount of the bond.

EXPENSE: The student will furnish his own clothing for outdoor work, which should be plain, heavy, and strong, and such other clothing of a better character as he may desire to have. He will also furnish at his own expense a horse and riding outfit when so directed by the Commissioner of Forestry. These will not be needed until the beginning of his second year. He will also bear his incidental expenses, which may be little or great, as he chooses.

SERVICE AND SUPPLIES FURNISHED BY THE STATE: Each student will be furnished by the State, free of charge, his tuition, board, room, room outfit, bed clothes, towels, books, stationery, plain washing, the use of a stable for his horse, horse feed, and horse shoeing. Each student must care for his own horse.

DEPOSIT: When a student enters the Academy he must make a deposit of \$5.00 in money with the Director, against which will be charged all items of unnecessary, careless, or wilful breakage or damage to State property. Whenever a deposit is lowered by reason of charges against it, the student will be required to increase the deposit at the beginning of each school year to the full amount of \$5.00. At the time of graduation there will be returned to him whatever balance may remain to his credit.

POSITIONS AFTER GRADUATION will depend upon the progress made and the standing attained during the three years' course. Salary after graduation for the first year is \$60 per month; second year \$75 per month; third year \$100 per month. When a student enters the employ of the State as a forester, he should retain his horse and riding outfit; but from this time forward the expense of maintenance of self and horse must be met by the forester and not by the Department.

FILLING VACANCIES: Vacancies may be filled at the discretion of the Commissioner of Forestry from among the remaining five men having had the practical training in the forest.

SCHOOL YEAR.

The successful applicants for entrance to the Academy report at the Academy on the first Monday in September. The first term lasts until the Christmas holidays (2 weeks). The second term lasts from January to the end of May. The summer term



FOREST MENSURATION.
Students estimating timber ripe for cutting.

covers the period from June 1 to August 15. The summer vacation (2 weeks), lasts from August 15 to September 1. The school year thus covers forty-eight weeks and the course includes three years or 144 weeks actually spent at work.

ORDER OF STUDIES.

Freshman Year.

First Term.	Hours.
(20) Botany I,	6
(16) Physics,	4
(33) English,	3
(3) Elementary Forestry,	5
(34) Business Law and Bookkeeping,	3
(31) German I,	3
(25) Chemistry I,	2

Second Term.

(21) Botany II,	6
(25) Chemistry I,	6
(33) English,	3
(6) Meteorology and Forest Influences,	4
(31) German I,	3
(15) Trigonometry,	4
(16) Physics,	2

**SUMMER TERM—Nursery Practice, Improvement Cuttings,
(22) Botany III.**

Junior Year.

First Term.

(4) Dendrology,	5
(5) Wood Technology and Timber Physics,	5
(23) Botany IV,	6

	Hours.
(26) Chemistry II,	6
(28) Geology,	4
(32) Scientific German II,	3

Second Term.

(11) Forest Utilization,	5
(7) Silviculture,	6
(4) Dendrology,	2
(24) Zoology,	6
(29) Soils,	5
(32) Scientific German II,	3
(27) Plant Chemistry,	2

SUMMER TERM—(12) Forest Mensuration.

Senior Year.

First Term.

(13) Forest Finance,	3
(8) Forest Protection,	6
(18) Surveying,	8
(14) Forest Management,	3
(30) Economics, General,	5

Second Term.

(1) Forest Economics and Policy,	3
(18) Surveying,	8
(19) Roads,	2
(14) Forest Management (Working Plan),	4
(10) Dendro-Pathology,	2
(17) Mechanics—Telephone construction, etc.,	1
(9) Forest Entomology,	2
(2) Forest History,	1



FOREST UTILIZATION.
Forestry students lumbering.
Note economy in saw and low stumps.

SUMMER TERM—(18) Topographic Surveying and Thesis.**(1) FOREST ECONOMICS AND POLICY (Prof Ziegler),
Senior Year—Second Term—3 hours.**

Lectures with reference work. Taking up Forest Statistics—Resources, Production, Consumption, Exchange: Forest Policy—National Forests, Tariffs, Education: State Policy: Private Policy (Associations, etc.): Policy of foreign countries.

**(2) FOREST HISTORY (Prof. Retan), Senior Year—Second
Term—1 hour.**

Lectures. History of the development of the forestry idea in Pennsylvania. Contemporaneous development in the United States as a whole. Colonial conditions and laws, the early botanists, the primeval forests of the State, the beginnings of lumbering, its rise and fall, the "Fathers of Pennsylvania Forestry," the history of the State Forest Academy.

**(3) ELEMENTARY FORESTRY (Prof. Illick), Freshman
Year—First Term—Lectures 2 hours, Field Work 3 hours.**

This course aims to lay a broad foundation for the later and more specific course in forestry. Special stress is laid upon the field work in the State forest of 25,000 acres adjoining the school. This State forest is considered the most instructive in Pennsylvania. Upon it are many plantations and improvement cuttings made within recent years. Each student is required to prepare a written report upon every field trip. This report is corrected and returned to him.

**(4) DENDROLOGY, (Prof. Illick), Junior Year—First and
Second Terms—Lectures 2 hours, Field Work 4 hours; Sum-
mer Term—Field Work.**

The course in Dendrology extends throughout the entire junior year and covers both the systematic and biological aspects

of trees. Special emphasis is laid on the species native to and commonly introduced into Pennsylvania. A more general study of the trees of the United States, especially those of commercial importance, is made in connection with the native species. The lectures are illustrated with fresh material, herbarium and museum specimens, photographs and lantern slides. Many of the dried specimens are mounted in Riker Specimen Mounts.

The field work of this course extends over the entire year. This is necessary in order to know the trees not only in their dormant or winter condition but also in the various stages of their active or summer condition. An afternoon of each week is given to field work and occasionally a long trip covers an entire day. The field work consists of pointing out the distinguishing characteristics and ecological factors of trees and of written tests on identification. The written test covers about 750 specimens each year. The woody flora about Mont Alto is very rich. It comprises over 150 species of trees and shrubs. Numerous ornamental trees and a small school arboretum are accessible.

A collection of winter twigs with buds mounted on cards and a key based on winter characteristics is required of each student. A complete library of books is accessible including Sargent's "Sylva of North America," 14 volumes, and Michaux's "North American Sylva," 5 volumes.

(5) WOOD TECHNOLOGY AND TIMBER PHYSICS (Prof. Illick), Junior Year—First Term—Lectures 2 hours, Laboratory 2 hours, Work Room 2 hours.

The course covers the structural, physical, mechanical, and chemical properties of wood and the uses which are and could be made of the various species. The microscopic study of wood elements is done in the botanical laboratory. A room 16x61 feet contains the collection of woods of the important tree species

of Pennsylvania and of some other species of commercial importance. This room is also used for practical work in wood identification. Bi-weekly tests are held in the workroom for identifying specimens of wood. Wood specimens are also included in the field test in dendrology. The workroom is equipped with work-benches and tools. A collection of Hough's "American Woods" is available.

(6) METEOROLOGY (Prof. Retan), Freshman Year—Second Term—4 hours.

The phenomena of the atmosphere, their explanation and the forecasting of the weather. United States weather maps are received and studied from day to day. Two experiment stations are maintained, one in the forest and one in the open, where daily reading of maximum-minimum thermometers and rain gauge readings are made by the students. Lectures and practical work in forest influences is given in connection with this course. Davis' Elementary Meteorology and Moore's Descriptive Meteorology are required.

(7) SILVICULTURE (Prof. Retan), Junior Year—Second Term—Lectures 3 hours, Field Work 3 hours.

Silvics; Forest Geography; Reproduction and Care of Forests, Planting, Sowing, and Nursery Practice, form the subdivisions of this course, the latter being the one most emphasized. Particular attention is given to Pennsylvania forest types and their treatment.

The practical work is very extensive and is not included under the three hours given to field work. Those hours are devoted to work in Silvics, trips being taken through the neighboring forests. In addition, in the spring, the class spends about two weeks each year in planting various species under a wide range of conditions. Later they go into the nursery and perform

very operation throughout the season from planting seed to lifting and shipping seedlings under the direction of an experienced nurseryman. During the summer, the class also makes experimental cleanings and thinnings in the forest on typical areas. A large number of plantations and thinnings made in previous years are now yielding unexcelled material for the study of the effects of such operations on the characteristic types of the State.

The library is well stocked with the best works on the subject. Schlich, Schenck, and Mayr are the texts assigned for study.

**(8) FOREST PROTECTION (Prof. Retan), Senior Year—
First Term—Lectures 3 hours, Field Work 3 hours.**

The course in Forest Protection is adapted to the conditions prevailing in the Pennsylvania forests. It does not include Entomology or Pathology. Emphasis is laid on the primary importance of the subject for Pennsylvania foresters. The grazing and the fire problems are taken up in detail and discussed from the standpoint of the differing conditions existing in the different parts of the State and also on the National Forests of the west. Methods of regulation and elimination, planning and working out a complete fire protective system, fire laws of the States, and protective measures and implements of other states are considered. Public education is discussed.

The field work consists of trips to this and neighboring forests for the study of the protective systems and the effects of grazing, fire, frost, heat, etc. In the nursery screens and mulches are experimented with. Numerous plantations are studied as illustrations of the effects of covers of various heights. Practical experience in telephone construction is given in another course. (See "Mechanics".)



FOREST ACADEMY SAW MILL.
Used in the Forest Utilization and Forest Mensuration Courses.

As the student body fights all the fires which occur in this forest they get practical training in this work throughout the three years of the course. The junior and senior classes are mounted to procure the highest efficiency in this respect. What is believed to be the first forest fire wagon built in the United States, with complete pack saddle equipment, is available.

**(9) FOREST ENTOMOLOGY (Prof. Adams), Senior Year—
Second Term—Lectures 2 hours.**

The anatomy, physiology, development, and classification of insects; the life histories of both beneficial and injurious species, with special reference to those forms which are of economic importance in the forest.

**(10) DENDRO-PATHOLOGY (Prof. Illick), Senior Year—
Second Term—Lecture 1 hour, Field Work and Laboratory
2 hours.**

This course considers some of the diseases of trees caused by cryptogamic parasites and parasitic flowering plants. The nature and life history of representatives of the principal classes are considered together with practicable preventive and remedial measures for checking their damage. The lectures are illustrated with photographs, lantern slides, and museum specimens. The museum collection comprises many of our common timber diseases and some foreign ones. Lectures are supplemented by field work in the State forest adjoining the school and in the school nursery.

**(11) FOREST UTILIZATION (Prof. Illick), Junior Year—
Second Term—5 hours.**

The work of this course is based on Schenck's "Forest Utilization." Special reference is given to methods of utilization applicable to the State of Pennsylvania, but the methods used in

other parts of the United States and in Germany are also considered. The course comprises not only school training but also practical experience in logging and lumber manufacture. Each student actually works at all operations from the marking of the trees for felling until the converted material is stacked in the lumber yard in the form of boards or dimension stock. A school saw mill together with a lath and shingle mill afford an excellent opportunity for practical instruction. Nearby wood-working plants are visited. Bi-weekly seminars are held at which students are required to present abstracts of current lumbering journals.

(12) FOREST MENSURATION (Prof. Illick), Junior Year.

The major part of the time of the months of June, July, and August, of the junior year are devoted to lectures, quizzes, written tests, compilation of field data and field work in Forest Mensuration. This course aims to lay a foundation for Forest Management. It is based on the texts of Graves and Schenck. Commercial and scientific methods of determining contents of felled trees and standing trees are considered. It also considers log rules and their application, the scaling of logs, increment, volume tables, yield tables, form factors, estimating mill factors, etc. A school saw mill is available to aid in working out some of the data. A portion of the time is spent in collecting data in the adjoining State forest for a stock survey and for a working plan.

(13) FOREST FINANCE (Prof. Ziegler), Senior Year—First Term—3 hours.

Lectures: Formulae—Compound Interest, Annuities, Periodic Payments, Discount; Comparison of Receipts and Expenses; Forest Valuation; Calculating Forest Damage; Annual Charges; Forest Taxation; Finance Problems.



FORESTRY STUDENTS ON A DENDROLOGY FIELD TRIP.
Identifying trees by buds when leaves are off.

**(14) FOREST MANAGEMENT (Prof. Illick), Senior Year—
First and Second Terms—Lectures 2 hours, Field Work 2
hours.**

Separate courses are given in Forest Management and Forest Finance so Forest Management is considered in a narrower sense and includes Organization, Administration, and Formulation of Working Plans. Special consideration is given to the normal forest, increment, growing stock, gradation of age classes, silvicultural systems of management, rotation, regulation, and distribution of yield, and working plans. Each class makes a geometric, qualitative, and quantitative survey of a certain forest area and formulates a rational scheme of procedure for its development. In addition each year a portion of the State forest is divided into permanent managerial figures (compartments) and a complete survey made of it with reference to site quality, growing stock, yield, rotation, increment, age classes, etc.

**(15) TRIGONOMETRY (Prof. Ziegler), Freshman Year—
First Term—4 hours.**

Course designed to cover trigonometric analysis, right and oblique triangles, and particularly the accurate use of logarithms and trigonometric tables in the solution of problems.

Text—Elements of Trigonometry—Phillips and Strong.

**(16) GENERAL PHYSICS (Prof. Netoffsky), Freshman Year—
First and Second Terms—4 hours lectures and recitations.**

A study of the fundamental principles of Physics and their application.

Equipment.

The physics equipment consists of a serviceable set of apparatus for demonstration purposes.

(17) MECHANICS (Prof. Netoffsky), Senior Year—Second Term—1 hour.

A study of the general principles of the construction and operation of machines, engines, boilers, telephone systems, and appliances that a forester has occasion to use. Visits of inspection to the neighboring manufacturing plants and engineering works are made during the term.

(18) SURVEYING—PLANE AND TOPOGRAPHIC, AND MAP DRAFTING (Prof. Ziegler), Senior Year—First and Second Terms—2 hours recitations, 6 hours drafting and field work followed by 10 weeks' summer work making topographic map of about 2,000 acres of forest land.

Includes compass surveying; levelling (spirit and barometric); plane-table and traverse-table work; stadia work; triangulation; practice in land surveying—particularly re-running old lines; testing tapes, transits, levels, etc.

Text—Plane Surveying—Tracy.

Equipment.

Two Randolph Mountain transits; one Young engineer's transit; one Gurley engineer's transit with gradienter; one plane-table with telescopic alidade with stadia equipment; two traverse boards; two 16 and 18 inch Wye levels; open sight compasses; barograph and aneroid barometers; standardized steel tape with spring balance attachment, etc.

Drafting equipment includes two wooden and one precision pantograph, polar planimeter, and blue-printing equipment.

(19) ROADS (Prof. Ziegler), Senior Year—Second Term—2 hours.

Lectures and field work (extra). History; traction principles; grades; drainage; purpose and location of forest roads; survey

and laying out line; construction of dirt roads; construction of surfaced roads; costs. References. Field work includes survey in locating and staking out mountain road, grading, and drain work; also critical examination of modern mountain surfaced and dirt roads.

(20) BOTANY I. (STRUCTURE AND PHYSIOLOGY OF THE SPERMATOPHYTA.) (Prof. Adams), Freshman Year—First Term—Lectures 3 hours, Laboratory Work 3 hours.

A study of the seed-bearing plants, cell structure, tissue formation, and structure and functions of the root, stem, and leaf systems. This is followed by a discussion of the life processes of plants, as absorption, transpiration, conduction, photosynthesis, irritability.

(21) BOTANY II. (EVOLUTION OF THE PLANT KINGDOM.) (Prof. Adams), Freshman Year—Second Term—Lectures 3 hours, Laboratory or Field Work 3 hours.

A careful study of representative examples among the algae, fungi, liverworts, mosses, ferns and their allies, gymnosperms and angiosperms, with special emphasis on the form of plant parts, and a comparison of them in the different groups. Special attention is also given to the alternation of generations in the plants studied, and in working out their life histories the progression and retrogression of certain organs and phases in proceeding from the lower to the higher plants is noted.

(22) BOTANY III. (TAXONOMY.)—(Prof. Adams)—Freshman Year—Summer Term—Lectures 2 hours, Laboratory or Field Work 8 hours.

A comparative study is made of the families of flowering plants, and special training is given in the methods of collection and preservation of material. Each student is required to make

an herbarium of at least 150 species of herbaceous plants, which are to be properly identified by means of Gray's New Manual of Botany.

Note:—Further work in the taxonomy of trees is given in the course in Dendrology.

**(23) BOTANY IV. (PLANT ECOLOGY.)—(Prof. Adams)—
Junior Year—First Term—Lectures 3 hours, Laboratory or
Field Work 3 hours.**

This course deals with the relation of plants to their environment. First, there is a study of the ecological factors, which in general are grouped under physical, climatic, and biotic factors. This is followed by a discussion of the struggle for existence among plants, the laws of migration, the analysis of vegetative forms and structures, plant formations and societies.

In the laboratory different members of the plant are studied as to their special functions and their relations to environment. The stem, root, leaf, flower, etc., are carefully examined and their ecological relations pointed out.

The Forest Academy is very favorably located for the study of Botany, as representative types of plant life may be found in the immediate vicinity of the school. Therefore students are able to work with fresh material which is a decided advantage over the studying of preserved or dried plants.

Equipment.

The equipment of the Botanical Laboratory consists of compound microscopes, each with high and low power objectives; dissecting microscopes; a complete set of charts; over 1,000 microscopic slides and a herbarium of over 3,000 specimens. An embedding oven and two microtomes offer facilities for the preparation of histological material.



IN THE BOTANICAL LABORATORY.

- (24) GENERAL ZOOLOGY (Prof. Adams)—Junior Year—Second Term—Lectures 3 hours, Laboratory or Field Work 3 hours.**

A general survey of the animal kingdom showing the gradual development from the Protozoa to the Vertebrata. The structure, habits, and life history of animals typical of the various phyla are studied in the laboratory and in the field.

- (25) CHEMISTRY I. (GENERAL INORGANIC)—(Prof. Netoffsky)—Freshman Year—Second Term—6 hours—Lectures, Recitations and Laboratory Work.**

An elementary study of the elements, their history, occurrence, preparation, properties, and their principal compounds.

The course includes the theory, laws, practice in equation writing, and problems.

- (26) CHEMISTRY II. (Continuation of CHEMISTRY I.)—(Prof. Netoffsky)—Junior Year—First Term—6 hours.**

A study of the properties, reactions, separation, and recognition of the common elements and their compounds.

The last half of the term is devoted to the study of the carbon compounds.

- (27) PLANT CHEMISTRY—(Prof. Netoffsky)—Junior Year—Second Term—2 hours. Lectures and Recitations.**

A study of the chemistry of the plant, its food, growth, and products.

The course includes the chemistry involved in wood utilization industries.

Equipment.

The chemical laboratory, accommodating twelve students, is well equipped with working tables, a system of individual lockers, wall cases, water, reagents, balances, and the usual apparatus.

**(28) GENERAL GEOLOGY—(Prof. Netoffsky)—Junior Year
Second Term—4 hours. Lectures, Recitations, Laboratory,
and Field Study.**

A study of the fundamental principles and facts of Geology. The course includes a study of the common minerals and rocks.

Equipment.

The geology equipment comprises a collection of fossils, minerals, rocks, and ores. Numerous maps and charts of the United States Geological Survey and of the Pennsylvania Geological Surveys are available for study purposes.

**(29) SOILS—(Prof. Netoffsky)—Junior Year—Second Term—
5 hours. Lectures, Recitations, Laboratory, Nursery, and
Field Study.**

A study of the origin, formation, properties, and classification of soils. The laboratory work includes studies of the physical and chemical characteristics of soils from the nurseries, plantations, and forest stands.

The field work consists of soil mapping and the management of soil in the nurseries and in planting.

Equipment.

The soils laboratory is equipped with many types of apparatus for soil study, and is used in connection with the chemical laboratory.

**(30) GENERAL ECONOMICS—(Prof. Ziegler)—Senior Year
—First Term—5 hours.**

An attempt to understand the principles of economics and their application to present conditions and problems. Extended reference work in other authors is required, and also the ex-

amination of current literature, particularly that relating to present governmental problems, most of which are economic in nature.

Text—The Elements of Economics—Bullock.

(31) GERMAN I. (Prof. Adams)—Freshman Year—First and Second Terms—3 hours.

Thomas' Practical German Grammar, Part I.
Translation of Bacon's "Im Vaterland."

(32) GERMAN II. (Prof. Adams)—Junior Year—First and Second Terms—3 hours.

First Term: Translation of Gore's "German Science Reader."
Second Term: Translation of Schwappach's "Forstwissenschaft."

(33) ENGLISH—(Prof. Retan)—Freshman Year—First and Second Terms—3 hours.

The course in English is designed to serve two ends. In the first place the student should be able to appreciate literature, Secondly, he should be able to express his thoughts clearly and well. Exercises are given in the formulation of reports and estimates. Weekly essays are written, based on the reading done and on the class room work. Speaking extemporaneously is encouraged. A Foresters' Club is maintained by the students at which debates and other literary exercises are required. Thoreau's "Walden" and Burke's "Conciliation" are the works studied critically.

**(34) BUSINESS LAW AND BOOKKEEPING—(Prof. Retan)
—Freshman Year—First Term—3 hours.**

An elementary course in the principles of law as met with by the forester as a business man. White's "Business Law" is followed.



A YOUNG HARDWOOD SPROUT FOREST THINNED BY FOREST STUDENTS.
About 7 cords per acre of defective and suppressed material removed.

The system of bookkeeping used by the Department of Forestry is taught.

GRADUATES.

Since its formation, fifty-three men have been graduated from the Academy. Of these almost all are at present in the employ of the State Forestry Commission, either in charge of State forests, or in special work of the Department. One is in the United States Forest Service in the west, two are in private work, and one is deceased. To these names should be added that of Arthur Davis, class of 1908, who died while an undergraduate. The names of the graduates and the present address of each follows:—

Name	Class	Address.
Avery, John E.	1906	Notch, Pike Co., Pa.
Bastian, John A.	1909	Loyalsock, Lycoming Co., Pa.
Bietsch, Tom O.	1908	McAleveysfort, Huntingdon Co., Pa.
Bodine, Alfred W.	1910	Newton Hamilton, Mifflin Co., Pa.
Brock, Ralph E.	1906	West Chester, Chester Co., Pa.
Bryner, Harold E.	1908	New Germantown, Perry Co., Pa.
Byers, William L.	1906	Rainsburg, Bedford Co., Pa.
Conklin, Robert G.	1906	Fayetteville, R. D. No. 2, Franklin Co. Pa.
Conklin, W. Gardiner.	1908	Troxelville, Snyder Co., Pa.
Dague, William F.	1908	Clearfield, Clearfield Co., Pa.
Dutlinger, Forrest H.	1908	Westport, Clinton Co., Pa.
Elliott, Harry E.	1909	Sinnamahoning, Cameron Co., Pa.
Emerick, R. Lynn.	1909	Cross Fork, Potter Co., Pa.
Evans, Horace C.	1908	Waterville, Lycoming Co., Pa.
Evans, W. Boyd.	1912	Sizerville, Cameron Co., Pa.
Fox, P. Hartman.	1911	Austin, Potter Co., Pa.
Funk, Nathaniel B.	1912	Cross Fork, Potter Co., Pa.
Helmsdean, B. Frank.	1907	Portland Office, U. S. Forest Service, Oregon.
Hogentogler, Joseph R.	1912	Rosecrans, Clinton Co., Pa.
Haupt, W. Elmer.	1909	Aitch, Huntingdon Co., Pa.
Irvin, James A.	1912	Medix Run, Elk Co., Pa.
Jerald, Frank D.	1910	Slate Run, Lycoming Co., Pa.
Keller, John W.	1910	Lloyd, Tioga Co., Pa.
Kirk, Carl L.	1909	Penfield, Clearfield Co., Pa.
Kraft, William H.	1906	Deceased.
Ludwig, Walter D.	1910	Bonlsburg, Center Co., Pa.

Name	Class	Address.
MacAvoy, John L.	1911	Ligonier, Westmoreland Co., Pa.
McNaughton, Nelson R.	1911	Karthaus, Clearfield Co., Pa.
McNeal, James E.	1907	Department of Forestry, Harrisburg, Pa.
Meek, Charles R.	1912	Coburn, Center Co., Pa.
Metzger, Homer S.	1909	Loganton, Clinton Co., Pa.
Miner, Clement C.	1910	Middlebury, R. D. No. 3, Tioga Co., Pa.
Morton, T. Roy.	1908	Petersburg, Huntingdon Co., Pa.
Mueller, Harry J.	1909	Bellefonte, R. D. No. 2, Center Co., Pa.
Mulford, Paul H.	1907	Asaph, Tioga Co., Pa.
Mumma, Walter M.	1911	North Bend, Clinton Co., Pa.
Mustin, Maurice.	1912	Department of Forestry, Harrisburg, Pa.
Retan, George A.	1909	Mont Alto, Franklin Co., Pa.
Robinson, Milton O.	1912	Canadensis, R. D. No. 1, Monroe Co., Pa.
Rupp, Alfred E.	1909	Fort Loudon, Franklin Co., Pa.
Ryon, James B.	1912	Glen Union, Clinton Co., Pa.
Seltzer, John W.	1909	Orwigsburg, Pa.
Sheeler, George W.	1912	Snow Shoe, Center Co., Pa.
Smith, Edgar H.	1911	Elmsport, Lycoming Co., Pa.
Staley, Lewis E.	1906	Mount Alto, Franklin Co., Pa.
Strobeck, John L.	1909	Cresco, Monroe Co., Pa.
Thomson, Harry A.	1909	Slate Run, Lycoming Co., Pa.
Vail, H. Lawrence.	1910	Conrad, Potter Co., Pa.
Warfield, D. Kerr.	1910	Milroy, Mifflin Co., Pa.
Wells, Arthur B.	1911	Fields Station, Lycoming Co., Pa.
Williams, John R.	1909	Pine Grove Furnace, Cumberland Co., Pa.
Winter, Raymond B.	1910	Mifflinburg, R. D. No. 2, Union Co. Pa.
Witherow, John L.	1907	East Waterford, Juniata Co., Pa.

Bulletin No. 9.

April, 1914.

Commonwealth of Pennsylvania

DEPARTMENT OF FORESTRY

ROBERT S. CONKLIN, Commissioner of Forestry

in Cooperation With the

Forest Service, U. S. Department of Agriculture

HENRY S. GRAVES, Forester

Wood-Using Industries

OF PENNSYLVANIA

By ROGER E. SIMMONS,

United States Forest Service,

1912.



HARRISBURG, PA.

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Fig. 1.—Virgin hemlock mixed with white pine in the Jack's Mountain Division of the Seven Mountains' State Forest. Shows types which Pennsylvania did and can produce.

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NOTICE

The study upon which this report is based was undertaken by the Department of Forestry of Pennsylvania in cooperation with the United States Forest Service, the work being done under the direction of Robert S. Conklin, Commissioner of Forestry of Pennsylvania, and O. T. Swan, in charge Office of Industrial Investigations, United States Department of Agriculture. The statistics were compiled from data collected in the summer of 1912, covering a period of one year from July 1, 1911 to June 30, 1912, inclusive.

ACKNOWLEDGEMENT

In the preparation of the text of the Pennsylvania Wood-Using Industry Report, the Forest Service desires to acknowledge the kind assistance of Hon. I. C. Williams, Deputy Commissioner of Forestry, Harrisburg, Pennsylvania, and Mr. John L. Strobeck, Forester; also of Foresters James E. McNeal, W. Gardiner Conklin, R. Lynn Emerick, and Walter D. Ludwig, of Pennsylvania, Department of Forestry, who assisted in the actual collection of data.

WOOD-USING INDUSTRIES OF PENNSYLVANIA

INTRODUCTION.

In the work of practical forestry, Pennsylvania is a leading State and bears this distinction as a result of the development and operation of an effective State-wide policy. To this Commonwealth also properly belongs the credit of being the cradle of American forestry. When William Penn made the well known provision in the Charter of Rights, that for every five acres cleared one should be left in woods, the seed of forestry was first sown. Following this, as early as 1700, the proprietary Government enacted forest fire laws, and from that time to the present, State Legislatures have debated upon and passed similar enactments. Popular sentiment favoring the practice of forestry by the State, grew steadily from the beginning, but in the past 20 years it has developed with remarkable rapidity. Directing this educational propaganda were men who have since gained prominence and who stand high among those recognized as authorities pertaining to forestry subjects.

Naturally, much has been written and said on all phases of forest conservation and improvement in Pennsylvania. In the discussions, the economic importance of forests, aside from the collateral values they are regarded as possessing, has been reckoned usually in terms of production of the rougher forest products, such as lumber, lath, shingles, crossties, cooperage stock, telegraph poles, fence posts, mine timbers, cordwood for fuel and distillation purposes. The commercial gain that comes to the State through the millions of feet of lumber that the forests supply through their conversion into such finished commodities as vehicles, boxes, handles, novelties, has always been recognized; but reference thereto has been made only in a casual manner as the detailed data have not heretofore been available. It is a well established fact that the cutting and shipping away of lumber and other forest materials like pulp wood, cooperage stock, chemical wood, etc., is not as permanent a commercial and industrial gain as when those materials find a home market and are held for the manufacture of finished articles within the State, but to what extent this development has taken place in Pennsylvania, no previous investigation has ever attempted to ascertain. This study has been projected, therefore, with this special view, and of outlining the relations of the wood-consuming industries to the growing forests, as well as of collecting information respecting wood uses and factory waste.

The information presented in this report covers the period of twelve months, prior to July, 1912. It was gathered in the late summer and fall of that year by the Department of Forestry of Pennsylvania, and by the Forest Service, United States Department of Agriculture, working under a co-operative agreement. The information was solicited from the manufacturers, not only from those producing complete wooden commodities, but from those making wooden parts of products, axe handles, brush blocks, and piano cases, for example; those factories that use lumber as a means of manufacturing other commodities, like patterns and flasks in foundry work, and factories of all kinds that require lumber in the marketing of their wares by manufacturing their own boxes and crates. The names and locations of all manufacturers were obtained through the assistance of the postmasters in the

State, and the thoroughness and accuracy of this report were made possible by the kind co-operation of the wood users in giving detailed information as to their individual operations. Report blanks were mailed to each, with the request that they be filled in and returned. After a time, agents representing Pennsylvania and the Federal Government were sent throughout the State to visit factories which had failed to report, and more particularly to study at close range processes of manufacture, waste problems, and industrial conditions. On completion of the field work, in accordance with agreement, the data were compiled and the report written by the office of Industrial Investigations of the Forest Service, whereupon the manuscript was turned over to the Pennsylvania Department of Forestry for revision and publication.

For a number of years the Federal Government has kept a record of the annual production of rough lumber and other forest products by States, and for the last seventeen years the State has been gathering similar statistics for Pennsylvania. These reports should not be confused with the present investigation, which in no way concerns the output of sawmills, except in a supplemental capacity. This investigation relates to the rough lumber after it leaves the sawmills and to the bolts and billets after they leave the woods, tracing them through different channels into commodities of final manufacture. It is not the purpose of this study to record the total quantity of wood used annually in the State. Much of it, in the form of rough lumber, goes into construction, which needs no other change than cutting or trimming the timbers, planks, or boards, to fit them into place in the house, bridge, tunnel, concrete forms, scaffolding, fences, etc. This material has not been taken into account and neither have the large quantities of dressed lumber which are brought into the State in the form of flooring, siding and ceiling, finished and ready for use. In addition there are parts of products made in other states and sent into Pennsylvania merely to be assembled; vehicle parts and box shooks are examples; also there are commodities partly manufactured, like club turned handles, spokes, rough bobbins and speeders, chair stock, etc., that have not been included in Pennsylvania but accredited to states in which the principal operations that change the forest material into the finished articles occur.

PURPOSE OF THE STUDY.

The Pennsylvania investigation has been conducted under the same plan as that followed by the Forest Service in 30 other states. Eventually, the information from all the states will be correlated in a national study and a series of publications issued by the Federal Government relating to the wood-using industries and the commercial woods of the United States.

Every factory was asked to state the amount of each species used, the commodity into which each was made, the form in which it was received, and whether these woods came from within Pennsylvania or from outside the State. Inquiries referred also to tendencies of manufacture, closer utilization, and methods followed for waste utilization. As stated above, no data were solicited from sawmills or those producing veneer, laths, shingles, crossties, cooperage, stock, posts, telegraph poles, chemical wood, pulp wood, etc. This information for all the States has been kept and reported annually by the Bureau of the Census, and such of these statistics as relate to Pennsylvania, appear in the appendix of this report; they were taken from the census bulletins issued for 1911-1912. Apart from the concerns producing the above named rough forest products, there are scattered throughout Pennsylvania nearly 5,100 factories that take wood and convert it into articles

of final form. These have been separated into classes or industries, and as much as possible of the data which they represent has been similarly arranged and is presented in this report in tabular form.

The question of the disposal of that part of the rough lumber cut going into the various channels of manufacturer is answered by this report and by the others of this series. For instance, the furniture woods are grouped together in the order of their importance as to amount consumed and in the same way is presented the species demanded for the making of other chief commodities, like chairs, vehicles, refrigerators, matches, farm implements, sporting goods, etc.

The Pennsylvania Department of Forestry and the United States Forest Service are constantly receiving inquiries from points throughout this and nearby states concerning markets for various kinds of timber and lumber, and are called on for data on practical uses of wood and for suggestions and advice on possible solutions of waste problems. This report will answer many of these questions. The farmer, the timber owner, and the sawmill man are aided in selling their material by having the information of the kinds of wood the manufacturers demand and of the forms and prices applying to their purchase. The manufacturers in turn are benefited in these added opportunities for buying raw material and in the suggestions offered for finding in the waste of another factory suitable materials for making their own wares. The report may also suggest to manufacturers possible substitutes of cheaper woods for the more costly ones that are being used, besides pointing out the chief regional sources from which the industries procure their raw material. Dealers in wooden products throughout the country can learn what the Pennsylvania manufacturers have to sell, while those outside of Pennsylvania who desire to dispose of their lumber or wood in other forms can find what the manufacturers demand.

To illustrate the use of this bulletin for reference, suppose information is requested concerning the raw material the handle makers demand. On page 96 appears Table 59, giving the list of handle woods, the prices and amounts of each, and other pertinent information, while in the directory appended to this report, grouped also by industries, appear the names and addresses of the handle manufacturers buying these woods, page 186. Again, suppose information is needed as to what uses are made of ash, with a view of selling to the best advantage. By first turning to the list of uses on pages 145, 146, one can find all commodities made in the State for which the manufacturers demand ash. Should interest be attracted to the use of this wood in the form of lumber, say for passenger cars, by means of the table of contents the industry table embracing prices f. o. b. factory and other data referring to car building material is quickly found. Then by turning to the names of car builders in the directory, all preliminary information is at hand relating to the conditions of marketing this material with the factories engaged in the industry.

FOREST CONDITIONS.

The earliest settlements were naturally in the hardwood regions of the eastern part of the State, where were found extensive forests of various species of oak and hickory. Chestnut, yellow poplar, black walnut, elm, white ash, basswood, and other valuable trees were also common and often attained large size. In the southern tier of counties were magnificent forests, mostly of deciduous growth similar to those in the eastern part of the State. Probably in no region of the United States were there finer hardwoods than here, and magnificent specimens still standing confirm this

presumption and make one realize the almost inconceivable wealth Pennsylvania had in her timber lands. West of the Allegheny River the prevailing timber was largely hardwoods, similar to those in eastern Pennsylvania; but in the central and northeastern parts of the State, in the mountains, is the home of the cone bearing trees, the pine and the hemlock. With these, especially in the northern counties, were associated beech, birches, sugar maple, ashes, the black cherry, and scattered stands of other hardwoods. At first there was an exceedingly limited market for timber, and the gigantic trees that constituted the forests proved a hindrance rather than an asset. The same destructive method of cutting them and rolling the logs together to be burned was pursued in Pennsylvania, with the same zest as in other timbered states. Even the older living citizens recollect the custom of removing timber by fire from ground which was to be used for agricultural pursuits. Farm land was needed above all, but the unabated desire to clear away the timber was not limited to areas suitable for cropping but was extended into thousands of acres that have since been abandoned, after being denuded, as unsuitable for profitable farming.

In the days of the early settlers of Pennsylvania, there was practically no market for hardwoods aside from what was required for local use. In comparison with the demand for softwoods to meet the needs for buildings and other structural purposes, the call for hardwoods was very limited. White pine was then regarded as the principal and only desirable lumber, and was the first in demand when the exploitation of the Pennsylvania forests began. Large rafts of pine logs were floated down the Susquehanna River and its tributaries as these streams drained a region abounding in the growth of this wood. About this period, large quantities of timber were sacrificed for the bark, which was peeled for tanning purposes; the logs being left in the woods to rot and burn. Not long after eastern woods had begun to be felled, similar activities were started in the forests of the far western part of the State. Here the Allegheny and Monongahela Rivers afforded the means of rafting large quantities of timber from that part, which, after being manufactured into lumber, was taken to market by water through the Ohio and Mississippi Rivers. The introduction of railroads extended the lumber industry inland, remote from the rivers, where the finest developed stands of conifers and hardwoods were abundant. After the great demand for white pine had considerably increased its price, hemlock began to attract attention. Though at first considered an inferior lumber, this prejudice soon faded away and Pennsylvania was destined to meet a constantly increasing demand for this species and has since been among the three States leading in hemlock products.

The marketing of the stands of magnificent hardwood forests which had to give way to provide room for agriculture and homes for farmers, was for many years an important economic problem in this State. There was little demand for this kind of timber abroad and still less in any of the other States. This presented the situation that if the hardwoods were to be exploited at all, it would be necessary to develop a market at home, by the establishment of factories like those concerned in this report, which would consume this material for making various manufactured products. These wood-working industries though prosperous, developed gradually at the outset. Later they not only rapidly increased in number, but grew to substantial proportions and contributed largely to the industrial expansion which gave Pennsylvania probably her early recognition as one of the leading manufacturing states. The products turned out by these industries not only

found markets in other states, but were demanded as important articles for export to European cities.

IMPORTANCE OF MANUFACTURING.

Besides the forests, the other natural resources of the State—coal, petroleum, gas, ore, stone, clay, and rich productive soil—have also influenced the starting and growth of particular industries. These resources, with the further advantages Pennsylvania offers through its harbors and waterways, and a network of railway systems, making raw material accessible and products easily marketed, have gained for Pennsylvania a commercial prestige surpassed by only one other state.

In the report of the 13th Census, taken in 1910, the Federal Government shows the valuable farm products taken from Pennsylvania in 1909 to approximate nearly 166½ million dollars; the value of mineral products, including the output of mines, wells, and quarries, amounted to 226½ million dollars; while for the same period the factories, 27,563 in number, gave an added value to raw material of nearly 1½ billions dollars. Manufacturing then is preeminently the first of Pennsylvania industries.

The wood-using industries, with which this report deals, constitute one of the important classes of the State's manufacturing enterprises. The value of the commodities turned out by them, together with that of the rough forest products produced, such as crossties, telegraph poles, etc., annually approximate \$100,000,000. Although this is small compared to the production of factories using iron and steel, it is next in importance and indicates clearly the part that forests and their affiliated industries have and are still taking in the commercial development of the State. The capitalization of these wood factories amounts to over \$63,000,000, and they give employment to nearly 100,000 wage earners, many of whom are skilled mechanics. It is known that the continued operation of these industries depends upon the future timber supply. And equally obvious is the fact that if these factories have to shut down and move closer to other timber producing regions, the result will be general industrial depression and loss.

FUTURE TIMBER SUPPLY.

For more than fifty years lumbering has been actively carried on in Pennsylvania, and has been especially active for the past twenty-five years. Valuable scattered tracts of old growth hemlock and hardwood timber are still to be found in the State, but they represent only a small percentage of its wooded area and before many years pass they will be consumed. It is, therefore, recognized that the second-growth forests will have to be depended upon to meet the demands of the manufacturer, and this can only be made possible by the practice of forestry, according to a definite State-wide policy similar to that which this State has already inaugurated.

Studies by the Pennsylvania Department of Forestry of forest conditions in the State, have pointed out vast areas like that contained in the State forests already established, that are better suited to forest growth than for agriculture. A large portion of these areas has a forest cover of valuable young trees in situations most conducive to their rapid growth. By the same practical and systematic management which is now being followed on the established forests, all of these lands can probably not only maintain the present lumber output of the State, but increase the production in a comparatively short time. In other words, the State, by looking to the future timber supply, can continue her three fold industry of growing timber, cutting it into lumber, and making it into commodities.

SCOPE OF THE STUDY.

This report is divided into three parts. Part I relates to the species of wood used by the wood-working factories in Pennsylvania, independent of their particular uses and the factories purchasing them. There is a general discussion of each wood, its range, and importance in the State as a lumber tree, the proportion of the amount used grown within the State, and a brief though particular enumeration of the properties of the wood. Uses are referred to only in a general sense by calling attention to the industries reporting the wood in large quantities.

Part II concerns the wood-using factories of Pennsylvania which have been divided into industries according to products manufactured. Following this is a discussion of individual industries, referring to the products manufactured, processes of manufacturing, woods demanded, and the principal qualities determining their use. In a majority of cases, the most suitable wood for each particular purpose is known, but the second best of the available kinds is pointed out where possible, and in this way, as well as in others previously mentioned, the report will prove valuable to wood users.

Part III is a summary of wood uses, independent of any industry classification or statistical data. In compiling this list, the Forest Service endeavored to arrange it to include every wooden commodity manufactured in Pennsylvania. It constitutes the most nearly complete compendium of uses of wood that has ever been arranged, and will be of particular value for reference. Part III further includes the directory of the names and addresses of manufacturers, grouped according to industries, who supplied the information contained in this report. The appendix presents data pertaining to Pennsylvania taken from reports of the Bureau of Census, United States Department of Commerce.

PART I.

KINDS OF WOOD.

A summary of the kinds of wood consumed in Pennsylvania manufacture, together with the cost, total quantity, and average price are presented in Table I following. Seventy-two kinds of wood were used within the State in the year 1911-12. White pine heads the list, representing nearly 14½% of the total, but had longleaf, loblolly, and shortleaf pine been grouped under the term "southern yellow pine" it would have stood first in the list, and in amount equal to more than ¼ of the total consumption.

It is interesting to know that the consumption of lumber in Pennsylvania exceeds the production. In 1912 the lumber cut by the State was 992,180,000 feet while the quantity consumed by the wood-using factories was 1,114,000,000 feet. Of the quantity used, 313,683,000 feet or 28% was accredited to the State, leaving 800,536,000 feet as coming from the forests of other States and from foreign countries. Cost is the principal consideration with the manufacturer purchasing raw material and the fact that his own State produces the same kind of lumber that he uses is of little consideration unless that material be the cheapest and readily and conveniently procured. That only a little more than one-fourth of the State's lumber production is consumed in factories within the State suggests a probable duplication in distribution that does not tend to economy. This condition is worthy of consideration by both lumber consumers and lumber producers, and when generally understood, can, through the medium of the regular trade agencies, be considerably improved.

So far as possible in this study, the data were presented by species rather than by genus in order to enable one more easily to study uses according to inherent properties. It is of far greater value to know that a wood is white oak, yellow poplar, or sugar maple than to have merely the generic name, oak, poplar, or maple. Owing to the many difficulties encountered this effort was but partially successful and was followed only to the extent warranted by the information furnished by the manufacturers and by general information as the particular uses of woods or the location where they were cut.

The southern states, and next to them the Lake states, contribute more of the shipped-in material than any other lumber producing region. Shipments of white pine, sugar maple, beech, birch, ash and elm were reported as originating in the Lake region. The largest part of the shipped-in supply of oak, yellow poplar, hickory, chestnut, and sycamore came from the forests of West Virginia, Maryland, Kentucky, and Tennessee, included within the hardwood region. Canada contributed a larger amount of wood but not as many kinds as the region embracing New York and the New England states, while the Pacific coast states sent a supply of six woods that aggregated nearly 10,000,000 feet. That such a large amount should have been brought over so great a distance to meet the demands of the Pennsylvania wood-users is significant of the growing scarcity of native eastern soft-woods.

Table 1.—Summary of kinds of wood used in Pennsylvania, year ending June, 1912.

Kind of Wood.		Quantity Used.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.
Common Name.	Botanical Name.	Feet b. m.	Per cent.		
White pine,	<i>Pinus Strobus</i>	160,749,759	14.43	\$81 55	\$5,071,607
Shortleaf pine,	<i>Pinus echinata</i> ,	149,744,213	13.44	23 34	3,494,950
Longleaf pine,	<i>Pinus palustris</i> ,	108,577,308	9.75	31 71	3,443,246
White oak,	<i>Quercus alba</i> ,	98,190,060	8.81	34 00	3,338,005
Red oak,	<i>Quercus rubra</i> ,	83,837,570	7.52	30 94	2,593,836
Yellow poplar,	<i>Liriodendron tulipifera</i> ,	56,720,991	5.09	32 62	1,850,151
Sugar maple,	<i>Acer saccharum</i> ,	54,955,805	4.93	22 29	1,225,049
Chestnut,	<i>Castanea dentata</i> ,	51,326,097	4.61	25 22	1,294,600
Loblolly pine,	<i>Pinus taeda</i> ,	51,241,544	4.60	19 91	1,020,167
Hemlock,	<i>Tsuga canadensis</i> ,	43,027,872	3.86	20 60	886,201
Beech,	<i>Fagus atropunctea</i> (<i>F. grandifolia</i>),	40,244,300	3.61	17 42	701,244
Cypress (bald),	<i>Taxodium distichum</i> ,	23,195,290	2.08	38 94	906,235
Red gum,	<i>Liquidambar styraciflua</i> ,	22,865,144	2.05	22 78	520,842
Spruce,	<i>Picea species</i> ,	20,539,028	1.84	21 34	438,216
Basswood,	<i>Tilia americana</i> ,	18,698,836	1.68	29 53	552,118
Birch,	<i>Betula species</i> ,	18,635,582	1.67	28 05	522,774
Hickory,	<i>Hicoria species</i> —(<i>Carya species</i>)	17,853,255	1.60	40 59	724,635
Ash,	<i>Fraxinus species</i> ,	14,304,627	1.28	44 02	629,752
Pitch pine,	<i>Pinus rigida</i> ,	10,630,700	.95	18 07	192,084
White elm,	<i>Ulmus americana</i> ,	9,708,643	.87	27 61	268,014
Cottonwood,	<i>Populus deltoides</i> ,	6,335,850	.57	26 66	168,938
Cotton gum,	<i>Nyssa aquatica</i> ,	5,957,687	.54	32 29	192,350
Spanish cedar,	<i>Cedrela odorata</i> ,	5,812,660	.52	112 93	656,435
Red and silver maple,	<i>Acer rubrum</i> and <i>Acer saccharinum</i> ,	5,711,275	.51	21 66	123,690
Black gum,	<i>Nyssa sylvatica</i> ,	4,957,160	.45	19 35	95,923
Southern white cedar,	<i>Chamaecyparis thyoides</i> ,	3,737,300	.34	41 74	155,986
Mahogany,	<i>Swietenia mahagoni</i> ,	3,680,254	.33	122 29	450,064
Douglas fir,	<i>Pseudotsuga taxifolia</i> ,	3,364,138	.30	43 19	145,296
Western white pine,	<i>Pinus monticola</i> ,	3,070,500	.28	40 22	123,496
Cherry (black),	<i>Prunus serotina</i> ,	2,723,493	.24	39 73	108,191
Scrub pine,	<i>Pinus virginiana</i> ,	2,386,095	.21	19 10	45,557
Norway pine,	<i>Pinus resinosa</i> ,	2,327,340	.21	28 74	66,897
Sugar pine,	<i>Pinus lambertiana</i> ,	1,213,700	.11	50 53	61,323
Red cedar,	<i>Juniperus virginiana</i> ,	878,500	.08	56 29	49,454
Western yellow pine,	<i>Pinus ponderosa</i> ,	830,000	.07	26 06	21,630
Black walnut,	<i>Juglans nigra</i> ,	782,615	.07	72 94	57,085
Sycamore,	<i>Platanus occidentalis</i> ,	697,073	.06	28 73	20,080
Cork elm,	<i>Ulmus racemosa</i> ,	672,200	.06	32 83	22,102
Hornbeam,	<i>Ostrya virginiana</i> ,	547,184	.05	43 83	23,985
Locust (black),	<i>Robinia pseudacacia</i> —(<i>R. pseudo-Acacia</i>),	505,850	.05	22 93	11,601
Redwood,	<i>Sequoia sempervirens</i> ,	505,682	.05	50 36	25,464
Western hemlock,	<i>Tsuga heterophylla</i> ,	500,000	.05	20 00	10,000
Cucumber,	<i>Magnolia acuminata</i> ,	351,400	.03	24 73	8,691
Yellow buckeye,	<i>Aesculus octandra</i> ,	324,200	.03	25 19	8,168
Applewood,	<i>Pyrus species</i> ,	172,435	.02	48 84	8,422
Dogwood,	<i>Cornus florida</i> ,	164,137	.01	22 59	3,708
Ebony,	<i>Diospyros species</i> ,	134,777	.01	188 18	25,363
Persimmon,	<i>Diospyros virginiana</i> ,	113,010	.01	58 92	6,659
Circassian walnut,	<i>Juglans regia</i> ,	108,140	.01	340 45	36,816
Butternut,	<i>Juglans cinerea</i> ,	86,810	.01	33 72	2,927
French briar,	<i>Erica species</i> ,	81,800	.01	351 34	28,740
Teak,	<i>Tectona grandis</i> ,	65,590	.01	191 95	12,590
Holly (American),	<i>Ilex opaca</i> ,	61,000	.01	99 10	6,045
Congo,	<i>Diospyros species</i> ,	60,000	.01	133 00	8,000
Western red cedar,	<i>Thuja plicata</i> ,	55,000	.01	39 09	2,150

Table 1.—Summary of kinds of wood used in Pennsylvania, year ending June, 1912—Continued.

Kind of Wood.		Quantity Used.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.
Common Name.	Botanical Name.	Feet b. m.	Per cent.		
Tamarack,	<i>Larix laricina</i> ,	40,300	**	28 81	1,161
Balsam fir,	<i>Abies balsamea</i> ,	40,000	**	45 50	1,820
Boxwood,	<i>Buxus sempervirens</i> ,	32,416	**	298 90	9,689
Aspen (popple),	<i>Populus tremuloides</i> ,	30,000	**	15 00	450
Willow (black),	<i>Salix nigra</i> ,	25,000	**	13 00	325
Sitka spruce,	<i>Picea sitchensis</i> ,	15,000	**	35 40	531
Rosewood,	<i>Dalbergia species</i> ,	6,185	**	462 89	2,863
Eucalyptus,	<i>Eucalyptus species</i> ,	5,000	**	260 00	1,300
Lignum-vitæ,	<i>Guaiaacum officinale</i> ,	2,050	**	175 61	360
Mountain laurel,	<i>Kalmia latifolia</i> ,	1,000	**	40 00	40
Sumach,	<i>Rhus hirta (R. typhina)</i> ,	500	**	80 00	40
Olive wood,	<i>Olea europæa</i> ,	480	**	81 25	39
Satinwood,	<i>Chloroxylon swietenia</i> ,	120	**	200 00	24
Sassafras,	<i>Sassafras sassafras (S. variifolium)</i> ,	50	**	25 00	1
Welchsel roots,	<i>Prunus mahaleb</i> ,	30	**	540 00	16
Sarbo, .....	.....	30	**	200 00	6
Doncella,	<i>Byrsonima spicata</i> ,	10	**	100 00	1
Total, .....	.....	1,114,219,650	100.00	\$29 15	\$32,483,227

Reeds,24,000 lbs.
 Rattan,2,000 lbs.
 *Less than 1-100 of 1 per cent.

Under the heading "Kind of Wood" the above table shows two separate lists of names. In the first column appear the names of the several woods as they are known to the trade, called common names. The scientific names which the botanists use to distinguish species are shown in the second column. In this and similar State reports, it has been the purpose of the Forest Service to call woods by their proper name with a view of standardizing nomenclature. Common names vary considerably according to locality but botanists as a rule are in agreement as to the scientific names. There are exceptions to this and among those shown in the above table are hickory, beech, locust, and sassafras. It will be noted that two botanical names are given for these woods. The first set is used by the Forest Service as given in the publication issued by the Federal Government entitled "The Check List of the Forest Trees of the United States." The second set is from the seventh edition of Gray's Botany which is used as a standard by the Pennsylvania Department of Forestry.

Thirteen of the species shown in the above table are foreign woods, the most prominent being Spanish cedar, and mahogany, followed by ebony and teak. Those accustomed to purchasing foreign woods in the form of logs, flitches, or lumber may regard the average cost of these woods as excessive. This is because a part of the supply of these woods is purchased in the form of thin veneer which, in order to be included in the tables of this report, was reduced to feet board measure with no allowance for waste or the cost of production.

THE WOODS GROWN IN PENNSYLVANIA.

Of the seventy-two woods which the manufacturers reported using, the entire amount of only six was home grown. These were aspen, (or popple), mountain laurel, sometimes called kalmia, black locust, sassafras, sumach and willow. The forests in the State also furnished a part of the supply of thirty-six other woods, making an aggregate of State-grown material used equal to a little more than 28% of the total consumption.

Instead of arranging the woods in the order of the quantity consumed, as in Table 1, they are shown in Table 2 alphabetically according to their generic names. This arrangement throws together consecutively the birches, the cedars, the oaks, the maples, and the pines, and allows an easy comparison of amounts of each species used, and if desired, an aggregate of any of them can be made readily. For a more convenient comparison of the home-grown woods with those grown out of the State, not only the quantities of these two classes are given for each species but also the per cent. which each class represents.

Table 2.—Summary of State-grown and shipped-in wood used in Pennsylvania, year ending June, 1912.

Kind of Wood.	Grown in Pennsylv- vania.		Grown Out of Pennsylvania.		Total.
	Quantity Feet b. m.	Per cent.	Quantity Feet b. m.	Per cent.	
Applewood,	87,425	50.71	85,000	49.29	172,425
Ash,	6,568,952	45.92	7,735,675	54.08	14,304,627
Aspen (popple),	30,000	100.00	.....	.....	30,000
Balsam fir, .....	.....	.....	40,000	100.00	40,000
Basswood,	7,933,764	42.49	10,765,072	57.57	18,698,836
Beech,	27,556,900	68.47	12,687,400	31.53	40,244,300
Birch,	9,826,614	52.73	8,808,968	47.27	18,635,582
Boxwood, .....	.....	.....	32,416	100.00	32,416
Buckeye, yellow,	184,000	56.76	140,200	43.24	324,200
Butternut,	79,500	91.58	7,310	8.42	86,810
Cedar, red,	17,500	1.99	861,000	98.01	878,500
Cedar, southern white, .....	.....	.....	3,737,300	100.00	3,737,300
Cedar, western red, .....	.....	.....	55,000	100.00	55,000
Cherry, black,	1,802,880	66.20	920,613	33.80	2,723,493
Chestnut,	22,479,333	43.80	28,846,764	56.20	51,326,097
Congo, .....	.....	.....	60,000	100.00	60,000
Cottonwood,	88,500	1.40	6,247,350	98.60	6,335,850
Cucumber,	235,600	67.05	115,800	32.95	351,400
Cypress (bald), .....	.....	.....	23,195,290	100.00	23,195,290
Dogwood,	140,122	85.37	24,015	14.63	164,137
Doncella, .....	.....	.....	10	100.00	10
Douglas fir, .....	.....	.....	3,364,138	100.00	3,364,138
Ebony, .....	.....	.....	134,777	100.00	134,777
Elm, cork,	154,600	23.00	517,600	77.00	672,200
Elm, white,	846,300	8.72	8,862,343	91.28	9,708,643
Eucalyptus, .....	.....	.....	5,000	100.00	5,000
French briar, .....	.....	.....	81,800	100.00	81,800
Gum, black,	272,716	5.50	4,684,444	94.50	4,957,160
Gum, cotton, .....	.....	.....	5,957,687	100.00	5,957,687
Hemlock,	31,217,942	72.55	11,809,930	27.45	43,027,872
Hemlock, western, .....	.....	.....	500,000	100.00	500,000
Hickory,	8,367,596	46.87	9,485,659	53.13	17,853,255
Holly, American, .....	.....	.....	61,000	100.00	61,000
Hornbeam,	397,184	72.59	150,000	27.41	547,184
Laurel, mountain,	1,000	100.00	.....	.....	1,000

Table 2.—Summary of State-grown and shipped-in wood used in Pennsylvania, year ending June, 1912—Continued.

Kind of Wood.	Grown in Pennsylv- vania.		Grown Out of Pennsylvania.		Total.
	Quantity Feet b. m.	Per cent.	Quantity Feet b. m.	Per cent.	
Lignum-vitæ,			2,050	100.00	2,050
Locust, black,	505,850	100.00			505,850
Mahogany,			3,680,254	100.00	3,680,254
Maple, red and silver,	3,073,275	53.81	2,638,000	46.19	5,711,275
Maple, sugar,	35,482,206	64.56	19,473,605	35.44	54,955,805
Oak, red,	25,681,362	30.63	58,156,208	69.37	83,837,570
Oak, white,	41,536,349	42.30	56,653,711	57.70	98,190,060
Olivewood,			480	100.00	480
Persimmon,			113,010	100.00	113,010
Pine, loblolly,			51,241,544	100.00	51,241,544
Pine, longleaf,			108,577,308	100.00	108,577,308
Pine, Norway,	25,000		2,302,340		2,327,340
Pine, pitch,	4,432,200	41.69	6,198,500	58.31	10,630,700
Pine, scrub,	105,500	4.43	2,286,595	95.58	2,392,095
Pine, shortleaf,	10,000	.01	149,734,213	99.99	149,744,213
Pine, sugar,			1,213,700	100.00	1,213,700
Pine, western white,			3,070,500	100.00	3,070,500
Pine, western yellow,			830,000	100.00	830,000
Pine, white,	69,236,764	43.07	91,512,995	56.93	160,749,759
Red gum,	5,500	.03	22,859,644	99.98	22,865,144
Redwood,			505,682	100.00	505,682
Rosewood,			6,185	100.00	6,185
Sassafras,	50	100.00			50
Satinwood,			120	100.00	120
Sarbo,			30	100.00	30
Spanish cedar,			5,812,660	100.00	5,812,660
Spruce,	1,786,400	8.70	18,752,628	91.30	20,539,028
Spruce, Sitka,			15,000	100.00	15,000
Sumach,	500	100.00			500
Sycamore,	31,603	4.53	665,470	95.47	697,073
Tamarack,	300	.74	40,000	99.26	40,300
Teak,			65,590	100.00	65,590
Walnut, black,	443,705	56.70	338,910	43.30	782,615
Walnut, Circassian,			108,140	100.00	108,140
Weichsel roots,			30	100.00	30
Willow, black,	25,000	100.00			25,000
Yellow poplar,	13,013,636	22.94	43,707,355	77.06	56,720,991
Total,	313,683,632	28.15	800,536,018	71.85	1,114,219,650

SPECIFIC DESCRIPTIONS.

Notwithstanding the very general substitution of other materials like concrete, metals, stone, and clay for wood there is no clear indication that the call for lumber and other forest products is decreasing at this time. With the opening of the Panama Canal and the changing conditions which are constantly taking place in trade, it is difficult to predict what the future will bring forth. As it is there is a large demand for lumber of all kinds and especially for the better grades of native woods. If there were an inexhaustible supply of timber now as there appeared to be fifty years or more ago, there would be less reason for making a study of this kind; but on account of the growing shortage of commercial timber it is most important that investigations be made to determine the qualities of woods that best fit them for a particular use. With this in view, this section of the report has been devoted to a brief account of the several woods used by the manufacturers.

In dealing with the properties of woods in the following paragraphs, a graded set of terms, such as hard, very hard, fairly hard, soft, very soft, etc., is used. These terms of course indicate an approximate scale and apply only to the average run of woods, as many conditions governing the growth of the tree affect materially the structure of the wood so that the same kind appears to have slightly different qualities. Generally the scale of terms used will serve to give a fairly clear idea of the properties of woods. To prevent confusion in their application, efforts have been made not to use them too loosely. The schedule setting forth the terms showing the relative gradations to which all descriptions of qualities conform will be found on page 60. By reference to this schedule the properties of the woods described may readily be studied and compared.

Lumbermen divide woods into two general classes, hardwoods and softwoods. This classification is not based so much upon the qualities of hardness and softness as upon distinction which custom has standardized because it is practical and holds true generally. Hardwoods are trees with broad leaves, while the softwoods have the needle leaf.

THE SOFTWOODS.

There are nineteen species of conifers going into final manufacture in Pennsylvania. Ten of them are pines, constituting nearly fifty per cent. of the total consumption, and of these the supply of seven is obtained entirely from other states, and of the three home-grown species, scrub and pitch pine are required in relatively small amounts, leaving white pine the foremost softwood representative of the Pennsylvania forests. Pine lumber is generally admitted to be the most valuable wood that the earth produces and the species that are used in Pennsylvania together with the other softwoods are described in the order of quantity as follows:

PINES.

White Pine (Pinus Strobus).

White pine was the first lumber tree in Pennsylvania that attracted the attention of the lumbermen. It was not found in this State in thick stands of vast areas like the white pine in the Lake regions and parts of New England, but it grew plentifully in various parts of the State. The trees were generally of large development, and in the early years of lumbering, Pennsylvania trees contributed a large proportion of the total white pine cut of the country. In 1880 the estimated cut of white pine in Pennsylvania amounted to 380,000,000 feet, in 1900, 221,000,000 feet, and in 1910 only 92,000,000 feet. In a few localities the remnants of the original stands are still being cut and here and there trees are found scattered among the hemlocks and hardwoods, besides the second growth that helps to make up the supply. White pine reproduces vigorously and in certain parts of the State under favorable conditions grows with astonishing rapidity. In quantity, it is the most used of any wood for manufacture in Pennsylvania, and owing to its valuable qualities of being light, soft, comparatively durable, of whitish color, easily worked, and holding its shape when in place, it is called for by the factories comprising thirty-two of the fifty-four industries. The largest quantity was used for making planing mill products and general mill work, and the next largest for boxes, these two industries accounting for 71% of the supply going to the Pennsylvania factories. It is interesting to note that white pine cut for Pennsylvania was only 2,000,000 feet more than the reported quantity of home-grown wood used. This gives white pine the distinction of being con-

sumed by manufacturers in the largest proportion of the amount cut in the State of any home grown tree that is important in the production of lumber.

Table 3.—Consumption of White Pine, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Grown Out of Pennsylvania.
Planing mill products,	62,556,492	38.92	\$36 53	\$2,285,337	29,261,299	33,295,193
Boxes and crates, packing,	51,583,373	32.00	21 03	1,084,714	19,390,373	32,193,000
Car construction,	12,829,420	7.98	51 38	402,637	4,041,869	8,787,551
Patterns and flasks,	9,141,449	5.69	56 09	512,735	2,276,198	6,865,251
Caskets and coffins,	4,793,000	2.98	18 90	138,495	709,500	4,089,500
Ship and boat building,	4,544,650	2.83	46 85	212,928	2,733,150	1,811,500
Pumps,	2,092,000	1.30	24 59	51,435	1,575,000	517,000
Boards,	1,000,000	.62	32 00	32,000	.....	1,000,000
Tanks and silos,	820,000	.51	34.84	28,570	60,000	760,000
Machinery and apparatus, electrical,	787,200	.49	40 02	31,504	150,000	637,200
Toys,	725,000	.45	24 90	18,050	487,500	237,500
Fixtures,	452,450	.28	45 64	20,649	100,450	352,000
Trunks and valises,	428,500	.27	28 60	12,255	128,500	300,000
Furniture,	298,700	.19	44 32	13,239	281,500	17,200
Mine equipment,	239,000	.15	23 70	5,665	13,000	226,000
Baskets, fruit and vegetables,	230,000	.14	21 00	4,830	230,000	.....
Woodware and novelties, ..	225,000	.14	11 78	2,650	225,000	.....
Butchers' blocks and skewers, ..	200,000	.12	22 00	4,400	200,000	.....
Machine construction,	143,500	.09	41 34	5,932	83,500	60,000
Vehicles and vehicle parts,	140,550	.09	34 62	4,866	118,050	22,500
Agricultural implements,	116,000	.07	31 71	3,678	26,000	90,000
Instruments, musical,	88,000	.05	34 56	3,041	.....	88,000
Dairymen's, poulterers' and apiarists' supplies,	79,000	.05	22 58	1,784	15,000	64,000
Laundry appliances,	78,200	.06	35 92	2,809	25,000	53,200
Excelsior,	63,500	.04	15 00	953	63,500	.....
Elevators,	62,200	.04	40 45	2,516	32,200	30,000
Manual training practice (sloyd), ..	21,575	.01	72 35	1,561	8,675	12,900
Gates and fencing,	5,000	*	22 00	110	5,000	.....
Plumbers' woodwork,	2,500	*	36 00	90	.....	2,500
Instruments, professional and scientific,	1,000	*	90 00	90	.....	1,000
Refrigerators and kitchen cabinets,	500	*	28 00	14	500	.....
Miscellaneous,	7,002,000	4.36	26 00	182,070	7,002,000	.....
Total,	160,749,759	100.00	\$31 55	\$5,071,607	69,236,764	91,512,995

*Less than 1-100 of 1 per cent.

Shortleaf Pine (*Pinus echinata*).

In quantity shortleaf pine is the most important yellow pine used by the Pennsylvania wood users. It was demanded, next to white pine, in the largest amount of any wood going into final manufacture in the State. Twenty-four industries report using this wood, but over ninety-one per cent. of the total went to three of them: boxes, planing mill products, and car construction. Shortleaf pine grows in Pennsylvania and, to a limited extent, is sawed into lumber; but the manufacturers report the use of the home cut wood in very small quantities and purchase almost their entire supply in the southern states. Shortleaf pine is a soft, yellow wood with considerable sap and has wider rings than the longleaf pine. Its qualities may be indicated

as intermediate or coarse grained, moderately hard, dense, tough and elastic, strong, stiff, durable, resinous, moderately stable, rather easy to work, and takes paint well. It is not infrequently bought and sold as longleaf pine, especially that coming from the Gulf states. The Virginia and Carolina shortleaf pine is generally handled under the name North Carolina pine, being a mixture of loblolly and shortleaf in the proportion of about four to one.

Table 4.—Consumption of Shortleaf Pine, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Grown Out of Pennsylvania.
Boxes and crates, packing,	52,719,727	35.21	\$18 00	\$949,003	.....	52,719,727
Planing mill products,	51,870,590	34.64	26 68	1,383,733	.....	51,870,590
Car construction,	32,724,334	21.85	26 10	854,105	.....	32,724,334
Boards, cloth, hosiery, etc.,	8,000,000	5.34	25 00	200,000	.....	8,000,000
Machinery and electrical apparatus,	968,200	.65	21 89	21,191	.....	968,200
Mine equipment,	567,000	.38	21 14	11,983	.....	567,000
Ship and boat building,	480,800	.32	28 74	13,820	.....	480,800
Vehicles and vehicle parts,	467,200	.31	26 67	12,461	.....	467,200
Refrigerators and kitchen cabinets,	453,750	.30	27 07	12,284	.....	453,750
Fixtures,	256,000	.17	25 92	6,635	.....	256,000
Patterns and flasks,	242,012	.16	20 89	5,056	.....	242,012
Equipment, playground,	240,000	.16	27 00	6,480	.....	240,000
Machine construction,	163,000	.11	23 99	3,910	10,000	153,000
Dairymen's, poulterers', etc., ..	145,000	.10	15 69	2,275	.....	145,000
Furniture,	141,000	.10	23 92	3,374	.....	141,000
Agricultural implements,	95,000	.06	29 74	2,825	.....	95,000
Tanks and silos,	86,200	.06	29 47	2,540	.....	86,200
Elevators,	50,000	.03	22 00	1,100	.....	50,000
Ladders,	25,000	.02	25 00	625	.....	25,000
Instruments, musical,	19,900	.01	34 52	687	.....	19,900
Plumbers' woodwork,	12,250	.01	28 00	343	.....	12,250
Handles,	12,000	.01	30 00	360	.....	12,000
Frames and moulding, picture, ..	5,000	*	30 00	150	.....	5,000
Manual training practice (sloyd), ..	250	*	40 00	10	.....	250
Total,	149,744,213	100.00	\$23 34	\$3,494,950	10,000	149,734,213

*Less than 1-100 of 1 per cent.

Longleaf Pine (*Pinus palustris*).

For strength, stiffness, and durability, longleaf pine is considered superior to other species of yellow pine. The distinguishing features of the wood are its narrow rings and its relatively small proportion of sapwood. It is hard, with fine straight grain, dense, moderately heavy, elastic, tough; splits rather easily, is fairly hard to work, and does not take paint well. Nearly three-fourths of all that is used in the State is consumed in car building, although seventeen other industries reported its use in varying small amounts. The most prominent among these are planing mill products, ship building, and the manufacture of tanks and silos.

Table 5.—Consumption of Longleaf Pine, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Car construction,	76,932,160	70.85	\$32 21	\$2,477,985	.....	76,932,160
Planing mill products,	19,612,698	18.06	29 39	576,370	.....	19,612,698
Ship and boat building,	5,286,000	4.87	37 56	198,520	.....	5,286,000
Tanks and silos,	2,565,000	2.36	26 57	68,150	.....	2,565,000
Machine construction,	1,431,000	1.32	27 66	39,585	.....	1,431,000
Vehicles and vehicle parts,	576,550	.53	34 33	19,791	.....	576,550
Agricultural implements,	563,200	.52	31 77	17,893	.....	563,200
Mine equipment,	423,000	.39	26 39	11,163	.....	423,000
Elevators,	269,900	.25	36 73	9,913	.....	269,900
Boxes and crates, packing,	241,800	.22	22 04	5,330	.....	241,800
Patterns and flasks,	234,000	.22	20 70	4,844	.....	234,000
Weighing apparatus,	200,000	.18	30 00	6,000	.....	200,000
Furniture,	138,500	.13	31 83	4,408	.....	138,500
Ladders,	50,000	.05	28 00	1,400	.....	50,000
Fixtures,	39,500	.04	32 41	1,280	.....	39,500
Equipment, playground,	7,000	.01	52 00	364	.....	7,000
Caskets and coffins,	6,000	*	37 50	225	.....	6,000
Machinery and electrical apparatus,	1,000	*	25 00	25	.....	1,000
Total,	108,577,308	100.00	\$31 71	\$3,443,246	.....	108,577,308

*Less than 1-100 of 1 per cent.

Loblolly Pine (Pinus taeda).

Loblolly pine does not grow in Pennsylvania though it has a wide range extending from southern Maryland through all the southern states and extends as far west as Texas. Most of that used in Pennsylvania was reported as coming from Virginia and North Carolina, in which states it constitutes the largest proportion of the lumber production. It is a soft, wide ringed, thick sapped, yellow pine. It has very coarse straight grain, is moderately hard, strong and durable, resinous, brittle, easy to season and work, and takes paint well. It closely resembles shortleaf pine and meets similar uses, so that no attempt is ever made to distinguish it commercially. Over 51,000,000 feet is demanded yearly by the Pennsylvania wood users for a great variety of purposes, but over nine-tenths is reported by the box makers and the manufacturers of sash, doors, blinds, and other planing mill products.

Table 6.—Consumption of Loblolly Pine, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Boxes and crates, packing,	36,173,429	70.59	\$17 51	\$623,493	.....	36,173,429
Planing mill products,	7,307,090	14.26	27 53	201,076	.....	7,307,090
Car construction,	4,827,625	9.42	25 98	125,422	.....	4,827,625
Boards, cloth, hosiery, etc.,	1,000,000	1.95	18 13	18,125	.....	1,000,000
Patterns and flasks,	579,000	1.13	20 27	11,738	.....	579,000
Equipment, playground,	400,000	.78	20 00	8,000	.....	400,000
Ladders,	400,000	.78	20 00	8,000	.....	400,000
Trunks and valises,	160,000	.31	24 22	3,875	.....	160,000
Fixtures,	153,000	.30	22 17	3,392	.....	153,000
Elevators,	96,500	.20	32 31	3,118	.....	96,500
Furniture,	58,000	.11	22 79	1,322	.....	58,000
Vehicles and vehicle parts,	41,900	.08	23 07	1,176	.....	41,900
Machine construction,	25,000	.05	32 00	800	.....	25,000
Instruments, musical,	3,000	.01	40 00	120	.....	3,000
Miscellaneous,	17,000	.03	30 00	510	.....	17,000
Total,	51,241,544	100.00	\$19 91	\$1,020,167	.....	51,241,544

Pitch Pine (Pinus rigida).

Pitch pine furnishes the largest amount of yellow pine lumber that is cut in Pennsylvania. The tree has a large proportion of sapwood and is decidedly resinous. It grows scatteringly throughout the State and is more extensively used than the total in Table 7 would indicate, owing to the fact that after it is cut into lumber it is difficult for the manufacturer to identify it. The wood is very brittle, of medium weight, hard, coarse grained, weak, stiff, durable, and does not hold paint. Its principal use in Pennsylvania for manufacturing is for boxes and crates, though it meets a wider demand for structural work and for other uses where rough timber is required without further manufacture.

Table 7.—Consumption of Pitch Pine, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Boxes and crates,	6,931,800	65.21	\$16 32	\$112,519	979,600	5,952,200
Planing mill products,	2,826,000	26.58	22 37	63,266	2,826,000	.....
Car construction,	458,600	4.31	16 10	7,383	214,800	243,800
Mine equipment,	246,000	2.32	23 07	5,675	246,000	.....
Vehicles and vehicle parts,	55,200	.52	22 77	1,257	55,200	.....
Machine construction,	49,100	.46	16 44	807	49,100	.....
Patterns and flasks,	44,000	.41	20 84	917	41,500	2,500
Fixtures,	20,000	.19	16 00	320	20,000	.....
Total,	10,630,700	100.00	\$18 07	\$192,084	4,432,200	6,198,500

Western White Pine (Pinus monticola).

This is not the species which produces the white pine lumber of Pennsylvania and the Lake states, but in appearance the wood closely resembles eastern white pine and is suitable for most of the purposes for which the eastern wood is used. Idaho, western Montana, and Washington supplied the most of it used in Pennsylvania. The industries demanding it are the makers of planing mill products and the car builders.

Table 8.—Consumption of Western White Pine, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Planing mill products,	2,914,500	94.92	\$39 55	\$115,281	.....	2,914,500
Car construction,	87,500	2.85	54 99	4,812	.....	87,500
Patterns and flasks,	28,000	.91	56 93	1,594	.....	28,000
Fixtures,	20,500	.67	46 78	959	.....	20,500
Caskets and coffins,	20,000	.65	42 50	850	.....	20,000
Total,	3,070,500	100.00	\$40 22	\$123,496	.....	3,070,500

Scrub Pine (Pinus virginiana).

This tree occurs most frequently in the coastal plain region from New York to Virginia, and for that reason is found in New Jersey and Delaware more extensively than in Pennsylvania. Its range extends from the clay ridges in the southeastern part of the State westward and northward into the foothills and mountain regions, scattered among the hardwoods. The common names in different localities are: Jersey pine, nigger pine, and bastard pine. On cut over areas restocking is heavy and springs up rapidly but the reproduction is best on old fields where in some localities it forms thick stands. It grows more slowly than loblolly or shortleaf and only a comparatively small proportion of the trees reach a size large enough for lumber. It has coarse, straight grain, wide sapwood, and is very brittle, soft, moderately strong, stiff, splits rather easily, is fairly durable and resinous. It can be recognized readily by its short dark green needles, two in a sheath, and by the fact that cones generally remain on the trees several years after they have dropped their seed. In Virginia the box makers and excelsior manufacturers use large quantities of this wood, while in Maryland and Delaware, it is cut into railroad ties, converted into boxes and crates, and, to a limited extent, is used for building materials. In Pennsylvania a quantity equal to the entire cut of yellow pine went to the box makers.

Table 9.—Consumption of Scrub Pine, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Boxes and crates, packing,	2,251,400	94.36	\$18 98	\$42,613	30,000	2,221,400
Planing mill products,	70,000	2.93	20 50	1,435	25,000	45,000
Car construction,	64,695	2.71	23 33	1,509	50,500	14,195
Total,	2,386,095	100.00	\$19 10	\$45,557	105,500	2,280,595

Norway Pine or Red Pine (Pinus resinosa).

Pennsylvania is the southern limit of the range of Norway or red pine. It occurs in the State infrequently on higher elevations, scattered with hardwoods. The reddish color of the bark is the easiest means of identification. It is most commonly cut into lumber in the New England states and in the Lake states near the Canadian border. All that has been said of white pine generally applies to Norway pine. The two trees grow mixed together and are marketed in most cases indiscriminately as white pine, the other constituting only a relatively small per cent. of the consignment. It differs from white pine in that it is slightly heavier, harder, and more resinous. Where color is a consideration, red pine is separately specified and this accounts for the distinction that the manufacturers make who reported it separately for this investigation. When sold alone as Norway pine it grades lower than white pine. None of that used in Pennsylvania was reported as growing within the State. It has fine, straight grain, medium sapwood, is moderately hard, fairly dense, of medium weight, moderately strong, stiff, non-elastic, fairly brittle, readily split and easily seasoned, easy to work and keeps its shape.

Table 10.—Consumption of Norway Pine, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Car construction,	1,518,300	65.24	\$28 97	\$43,985	25,000	1,493,300
Planing mill products,	526,000	22.60	29 20	15,357	.....	526,000
Elevators,	100,000	4.29	28 00	2,800	.....	100,000
Boxes and crates, packing,	90,000	3.87	20 00	1,800	.....	90,000
Tanks and silos,	50,000	2.15	35 00	1,750	.....	50,000
Patterns and flasks,	43,040	1.85	28 00	1,205	.....	43,040
Total,	2,327,340	100.00	\$28 74	\$66,897	25,000	2,302,340

Sugar Pine (Pinus lambertiana).

Sugar pine is the largest pine tree in the United States and is cut almost entirely in California. The name is due to a sugary substance which exudes from the tree when the wood is bruised. It is a true white pine and the wood, except for its being slightly more resinous, is quite similar in appearance to eastern white pine. The uses of the two pines are almost identical, and for a number of purposes the western wood is substituted for the eastern. Sugar pine has a fine straight grain, narrow sapwood, is soft, fairly dense, of very light weight, moderately strong, stiff, non-elastic, easily split and seasoned, and very easy to work. Over a million feet are annually demanded by the Pennsylvania manufacturers. The largest quantity goes to the producers of sash, doors, and blinds. It is also demanded in considerable quantities for foundry patterns and for special uses in store and office fixtures.

Table 11.—Consumption of Sugar Pine, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Planing mill products,	1,122,000	92.45	\$48 20	\$54,078	.....	1,122,000
Patterns and flasks,	50,000	4.12	85 00	4,250	.....	50,000
Fixtures,	25,000	2.06	65 00	1,625	.....	25,000
Instruments, musical,	11,200	.92	87 50	980	.....	11,200
Instruments, professional and scientific,	5,000	.41	70 00	530	.....	5,000
Manual training practice (sloyd),	500	.04	80 00	40	.....	500
Total,	1,213,700	100.00	\$50 53	\$61,323	.....	1,213,700

Western Yellow Pine (Pinus ponderosa).

This species next to Douglas fir is more extensively cut into lumber than any of the other western woods, and in the western and central states is used for every purpose for which wood can be employed. Its range includes nearly all of the Rocky Mountain and Pacific coast states. On the market it goes to a large extent as white pine. Sometimes it is called California white pine and in the eastern states dealers give it assumed names, as in Philadelphia it was found being sold as maraschino white pine. The wood in a large number of cases closely resembles white pine and by ocular examination it is difficult to distinguish. It is, however, a true yellow pine, fine grained, and although somewhat heavier and more resinous than white pine, meets a number of uses for which white pine has heretofore been used. It is a cheaper wood and for that reason is a valuable lumber tree and has great possibilities. Box makers and the planing mills are the industries using it most extensively in Pennsylvania.

Table 12.—Consumption of Western Yellow Pine, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Boxes and crates, packing,	500,000	60.24	\$20 00	\$10,000	.....	500,000
Planing mill products,	320,000	38.56	34 94	11,180	.....	320,000
Furniture,	10,000	1.20	45 00	450	.....	10,000
Total,	830,000	100.00	\$26 06	\$21,630	.....	830,000

HEMLOCKS.

Hemlock (Tsuga canadensis).

Although the cut in Pennsylvania is over 150 times the amount the manufacturers use, it is interesting to note that twenty-seven per cent. of the hemlock going into further manufacture came from other states. In 1912 Pennsylvania ranked third in the production of hemlock lumber, being surpassed by Michigan and Wisconsin. Of the imported wood, West Virginia and New York furnished the largest amount. This is the eastern species of the hemlock, that grows from Nova Scotia to Georgia and as far west as Minnesota. It is light, brittle, cross grained, and coarse. It is more difficult to work than the pines and has more of a tendency to warp and twist. It is, however, strong and stiff and non-resinous, holds nails well, and is fairly durable. It is cheaper than similar grades of the principal pines, and in the east central states it is more largely used than any other wood for framing, sheathing, and other uses of rough lumber in building construction. Among the factories of the State, the box industry and that of the planing mills use the largest amounts of this wood, but ten other industries demand small quantities for a variety of purposes.

Western Hemlock (Tsuga heterophylla).

Another species of hemlock was found being used in Pennsylvania, and it is interesting to note that it is the kind that grows only in the far western states commonly known as western hemlock to distinguish it from the eastern wood. This tree usually attains larger sizes than the eastern hemlock, but, like the latter, is found in association with other species and seldom in pure stands. It ranges from two to five feet in diameter and when cut into lumber, generally classes higher, showing less defects than its eastern relative. It is used by only one industry in Pennsylvania, the makers of tanks and silos.

Table 13.—Consumption of Hemlock, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Planing mill products,	23,077,000	53.63	\$21 24	\$490,263	15,349,900	7,727,100
Boxes and crates, packing,	9,269,637	21.54	16 85	156,224	5,365,055	3,904,580
Ship and boat building,	4,343,000	10.09	25 92	112,551	4,217,000	126,000
Mine equipment,	2,260,750	5.26	20 82	47,066	2,260,750	.....
Car construction,	2,006,075	4.66	15 53	31,153	1,975,075	31,000
Caskets and coffins,	1,000,000	2.32	28 00	28,000	1,000,000	.....
Machine construction,	296,000	.69	18 22	5,392	296,000	.....
Patterns and flasks,	291,500	.68	18 37	5,356	291,500	.....
Dairymen's, poulterers' and apiarists' supplies,	215,000	.50	15 49	3,330	215,000	.....
Machinery and apparatus, electrical,	143,600	.33	26 85	3,856	143,600	.....
Fixtures,	44,300	.10	26 64	1,180	30,300	14,000
Refrigerators and kitchen cabinets,	37,100	.09	22 13	821	33,100	4,000
Tanks and silos,	25,000	.06	18 00	450	25,000	.....
Elevators,	3,800	.01	30 00	114	3,800	.....
Instruments, musical,	2,600	.01	35 00	91	1,600	1,000
Manual training practice (sloyd),	262	.....	34 35	9	262	.....
Miscellaneous,	12,250	.03	28 16	345	10,000	2,250
Total,	43,027,872	100.00	\$20 60	\$886,201	31,217,942	11,809,930

CYPRESS.

(Taxodium distichum)

In Pennsylvania cypress next to yellow pine is the most widely used of any lumber coming from the southern states. It is typically a swamp tree of the southeastern coast and gulf region and up the Mississippi Basin as far as Missouri. The wood is light, soft, straight-grained, and of fine texture. Though more difficult than some woods to season properly, it holds its shape when thoroughly dried and is one of the most durable woods for which the manufacturers call. These qualities make it desirable for many purposes. The planing mills use the largest quantities, not only for porch, cornice, and other exterior work, but also for doors, sash, panels, moulding and other interior finish. The other seventeen industries in the State demanding this wood and the quantities used are listed in the following table:

Table 14.—Consumption of Cypress (Bald), year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Planing mill products,	18,790,200	81.01	\$39 68	\$745,612	.....	18,790,200
Boxes and crates, packing,	1,719,250	7.41	16 62	28,570	.....	1,719,250
Tanks and silos,	1,138,000	4.90	56 32	64,090	.....	1,138,000
Dairymen's, poulterers', etc., ..	545,000	2.35	37 02	20,175	.....	545,000
Car construction,	352,800	1.52	37 93	13,380	.....	352,800
Ship and boat building,	287,000	1.24	55 64	15,970	.....	287,000
Fixtures,	111,800	.48	37 38	4,173	.....	111,800
Furniture,	80,500	.35	43 19	3,477	.....	80,500
Ladders,	62,500	.27	54 64	3,415	.....	62,500
Laundry appliances,	39,000	.17	39 10	1,525	.....	39,000
Agricultural implements, ..	30,000	.13	35 00	1,050	.....	30,000
Caskets and coffins,	20,000	.09	40 00	800	.....	20,000
Elevators,	10,000	.04	55 00	550	.....	10,000
Gates and fencing,	3,840	.02	55 00	211	.....	3,840
Instruments, musical,	2,500	.01	43 60	109	.....	2,500
Manual training practice (sloyd), ..	1,750	.01	63 43	111	.....	1,750
Vehicles and vehicle parts,	1,000	.....	50 00	50	.....	1,000
Machine construction,	150	.....	75 00	11	.....	150
Total,	23,195,290	100.00	\$38 94	\$903,235	.....	23,195,290

SPRUCE.

Two species of eastern spruce, namely, red and white, and one northwestern species, Sitka spruce, are reported by the Pennsylvania manufacturers. It is impossible from the information obtained to present separate statistics for the eastern species. The red spruce, the species common in New York, Maine, and New Hampshire, is the tree appearing on the mountains in various parts of Pennsylvania. In 1912 spruce was reported cut by 129 sawmills of the State. The white spruce came into the State largely by water through the Great Lakes, from Wisconsin, Michigan, and Minnesota, where it is the common lumber tree. In appearance, qualities and sizes white spruce resembles red spruce. Spruce lumber irrespective of species is being substituted for white pine, especially in constructive work, box making, tanks and silo manufacture, and many other less important places where white pine was formerly used. Compared with it, however, spruce is weaker, less durable, more brittle, harder to work, whiter and of finer grain. It is non-resinous and therefore valuable for containers of foodstuffs. The western wood, Sitka spruce, comes from Washington and is used for a few special purposes. The planing mills reported its entire amount.

Table 15.—Consumption of Spruce, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Boxes and crates, packing,	14,648,870	71.32	\$17 42	\$255,211	975,350	13,673,520
Planing mill products,	1,999,734	9.74	29 96	59,904	176,350	1,823,384
Car construction,	1,367,636	6.66	26 35	36,032	189,700	1,177,936
Ship and boat building,	1,013,000	4.93	31 06	31,464	200,600	813,000
Refrigerators and kitchen cabinets,	413,800	2.01	37 39	15,474	190,000	223,800
Instruments, musical,	325,500	1.58	43 24	14,075	.....	325,500
Patterns and flasks,	223,983	1.09	33 63	7,533	44,000	179,983
Ladders,	191,000	.93	43 40	8,290	.....	191,000
Frames and moulding, picture, ..	100,000	.49	30 00	3,000	.....	100,000
Tanks and silos,	100,000	.49	20 00	3,000	.....	100,000
Machinery and apparatus, electrical,	87,700	.43	26 00	2,280	.....	87,700
Gates and fencing,	36,000	.17	25 00	900	.....	36,000
Elevators,	10,000	.05	30 00	300	10,000	.....
Vehicles and vehicle parts,	8,000	.04	48 38	391	1,000	7,000
Fixtures,	1,500	.01	42 00	63	.....	1,500
Toys,	1,300	.01	43 00	56	.....	1,300
Woodenware and novelties,	1,000	.....	43 00	43	.....	1,000
Miscellaneous,	10,000	.05	20 00	200	.....	10,000
Total,	20,539,028	100.00	\$21 34	\$438,216	1,786,400	18,752,628

DOUGLAS FIR.

(Pseudotsuga taxifolia).

Over three and a third million feet of Douglas fir, often called Oregon pine, is brought from the far western states to Pennsylvania to meet the demands of three industries: Ship building, planing mill products, and the manufacture of tanks and silos. It is primarily reported for structural work, because it possesses superior tensile strength, and, because it grows in large sizes and timbers of large dimensions are readily obtainable. In this latter respect it is the chief competitor of longleaf pine in the eastern and middle states. It is also valuable as a decorative wood, owing to its attractive grain and figure and the fact that it takes stain readily. This accounts for its rapid growth in popularity in recent years for doors, moulding, wainscoting, stairwork, and for other interior finish.

Table 16.—Consumption of Douglas Fir, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Ship and boat building,	2,521,000	74.94	\$42 41	\$106,926	.....	2,521,000
Tanks and silos,	450,000	13.37	43 33	19,500	.....	450,000
Machine construction,	200,000	5.94	51 25	10,250	.....	200,000
Planing mill products,	108,500	3.23	43 33	4,701	.....	108,500
Car construction,	70,238	2.09	45 55	3,199	.....	70,238
Miscellaneous,	14,400	.43	50 00	720	.....	14,400
Total,	3,364,138	100.00	\$43 19	\$145,296	.....	3,364,138

CEDARS.

Red Cedar (Juniperus virginiana).

The Pennsylvania wood users report the use of three woods known as cedars. Two of them grow in Pennsylvania and the other is a western wood. Red cedar, often called juniper, has a range covering all the states east and several west of the Mississippi River, but now commercially most abundant in Tennessee and southward. The Pennsylvania factories consume annually 861,000 feet of this and only about two per cent. was cut in the State. It was called for by nine industries, the most important of which were makers of professional instruments, including the lead pencil makers, planing mill products, furniture and caskets.

Table 17.—Consumption of Red Cedar, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Instruments, professional and scientific,	240,000	27.32	\$52 00	\$12,480	.....	240,000
Planing mill products,	213,000	24.25	49 27	10,495	10,000	203,000
Furniture,	178,100	20.27	60 81	10,830	.....	178,100
Caskets and coffins,	169,000	19.24	66 72	11,275	.....	169,000
Dairymen's, poulterers' and apiarists' supplies,	45,000	5.12	55 00	2,475	.....	45,000
Brushes,	23,000	2.63	64 57	1,485	5,000	18,000
Boxes and crates, packing,	5,000	.57	35 00	175	.....	2,500
Manual training practice (sloyd),	400	.04	97 50	39	.....	400
Miscellaneous,	5,000	.57	40 00	200	.....	5,000
Total,	878,500	100.00	\$56 29	\$49,454	17,500	861,000

Western Red Cedar (Thuja plicata).

The western cedar is the largest cedar that grows and it is the foremost shingle wood of the country. It is commonly cut into wide boards and plank and is more abundant than eastern cedar, but the wood is lighter, weaker, softer, less durable, and more spongy in texture. The red cedars are so named on account of the color of the heartwood and the white cedar on account of its lack of color. The planing mills are the only class of factories bringing the western red cedar into Pennsylvania.

Southern White Cedar (Chamaecyparis thyoides).

Southern white cedar grows principally near the Atlantic Coast on lowlands and is best developed in states from New Jersey southward. The western limit of its range is in the extreme eastern portion of Pennsylvania, but none of the wood the manufacturers used was State-grown. The boat builders and the tank and silo makers accounted for ninety-seven per cent. of all the nearly four million feet used in the State. White cedar lumber is readily seasoned, easily worked, splits straight, and is regarded the most durable of any of the domestic woods. It possesses a remarkably straight, fine grain and a fine compact structure. It is probable that a small per cent. of this wood reported as white cedar may have been the northern white cedar often called arborvitae (*Thuja occidentalis*), but there was nothing in the information received to indicate it. Arborvitae is found on high elevations as far south as North Carolina but south of New York State rarely attains sufficient size to be of any commercial importance.

Table 18.—Consumption of Cedar, Southern White, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Tanks and silos,	2,554,000	68.34	\$36 31	\$92,740	.....	2,554,000
Ship and boat building,	1,081,000	28.92	56 40	60,970	.....	1,081,000
Gates and fencing,	100,000	2.68	20 00	2,000	.....	100,000
Furniture,	1,300	.03	120 00	156	.....	1,300
Planing mill products,	1,000	.03	120 00	120	.....	1,000
Total,	3,737,300	100.00	\$41 74	\$155,986	.....	3,737,300

REDWOOD

(*Sequoia sempervirens*).

This tree is closely related to the famous "Big Trees," which attain the largest size of any known tree. Practically all of the redwood lumber produced in this country comes from California. Redwood, and the sugar pine, the other California wood described above, are the highest priced softwoods that the Pennsylvania manufacturers report. Owing to its fine texture, great durability, stability in place, and excellent quality, redwood is more and more entering the eastern markets in spite of its cost. Its name is due to the red color of its wood, which fades when long exposed to the weather.

Table 19.—Consumption of Redwood, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Planing mill products,	197,132	38.98	\$49 19	\$9,697	.....	197,132
Patterns and flasks,	136,000	26.89	60 74	8,260	.....	136,000
Car construction,	100,000	19.77	36 00	3,600	.....	100,000
Caskets and coffins,	20,000	3.96	54 00	1,080	.....	20,000
Printing material,	20,000	3.96	63 00	1,260	.....	20,000
Ship and boat building,	20,000	3.96	52 30	1,046	.....	20,000
Instruments, musical,	10,000	1.98	40 00	400	.....	10,000
Rollers and poles,	2,000	.39	45 00	90	.....	2,000
Fixtures,	500	.10	55 00	28	.....	500
Manual training practice (sloyd),	50	.01	60 00	3	.....	50
Total,	505,682	100.00	\$50 36	\$25,464	.....	505,682

TAMARACK.

(*Larix laricina*).

Pennsylvania marks the southern limit of the eastern species of tamarack. Of the limited quantity of lumber used by the factories, a small per cent. was from timbers cut in the extreme northwestern part of the State. It is distinctly a swamp tree, but the wood in its physical properties is similar to southern pine, although it is claimed to be more durable. In quality it is hard, dense, moderately heavy, strong, very stiff, moderately tough, elastic, hard to split, difficult to work, non-resinous, and with an intermittent grain. Only two industries in Pennsylvania reported the use of tamarack. It went for parts in boat building and to the planing mills for finished material used in house construction.

BALSAM FIR.

(*Abies balsamea*).

Balsam fir is found growing in Pennsylvania, but being near the southern limit of its range the trees are of small size and of little commercial value. In the Lake states and in New England, as well as throughout the whole of Canada, this tree grows in swamps, usually associated with tamarack, black spruce, white cedar, etc. It appears also on the uplands, but it is much less common. The wood is soft, weak, and perishable, but has long, tough, colorless fibers, which make it valuable in paper manufacture. Like black spruce, its principal use is for pulp.

In Canada ninety-five per cent. of this wood is said to be cut for this purpose. The lumber serves many of the purposes for which spruce is demanded, but in Pennsylvania the planing mills were the only class of manufacturers reporting it.

THE HARDWOODS.

In the use of wood for making articles of final form a larger quantity of softwood is demanded than of hardwood; but the hardwoods meet a greater number of uses than softwoods and are more important as to distribution among the various industries. The hardwoods form about forty-five per

cent. of the total lumber cut in the State, and of the thirty-five kinds reported for manufacture, exclusive of the imported foreign woods, all but five were cut wholly or in part within the State, while of the twenty-three conifers or softwoods a portion of the supply of only thirteen were returned as State-grown.

OAKS.

The oaks are the leading hardwoods consumed by the Pennsylvania wood users. In trade the wood of the oaks is separated into two general classes, white oaks and red oaks, but the botanist's classification, which is based on difference in flower, fruit, and leaf, divides the oaks into more than fifty species. The manufacturer bases his distinction upon the qualities of the wood. The white oaks possess an even grain and fine texture, and are usually strong, hard, heavy, tough, dense, and durable but difficult to season; the red oaks are less strong and durable, and not so dense, but more easily worked because softer, more easily kiln-dried and, on account of being more porous they take stains and varnish more readily. Oak is brought into Pennsylvania in greater quantities than any other wood except shortleaf pine notwithstanding the fact that the cut of State-grown oak exceeds the quantity used by the manufacturers by over ninety million feet. There are many instances in which oak is demanded because it is the best suited and often the only practical material for the purpose. This accounts for the wood being first in importance for meeting a greater number of uses in Pennsylvania than any other American wood. Thirty-five industries demand some one or more of the white oak group and thirty-two industries one or more of the red oaks. The number of uses reported, as shown in the summary in the following pages, for the white oak is 738 and for the red oak 310. The car builders consume over one-half of the former and considerably more than one-third of all the latter that goes into further manufacture in the State. The furniture makers, including the chair industry, use over six and one-half million feet more red than white oak, but on the other hand, for vehicles, ship building, machine construction and agricultural implements white oak is largely preferred to red oak. For a comparison of the qualities of the two classes, the white oaks may be said generally to have intermediate straight grain, and are very hard, porous, very heavy, very strong, moderately stiff and elastic, and tough. They also split easily, are durable, rather difficult to season and to work. The red group generally are relatively coarse, straight grained, very hard, very porous, heavy, strong, stiff, non-elastic, and tough. This wood splits rather easily, is moderately durable, and rather difficult to season.

Table 20.—Consumption of Oak, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Car construction,	81,393,363	44.72	\$26 14	\$2,127,488	30,089,792	51,303,571
Planing mill products,	29,806,771	16.38	44 05	2,313,133	10,809,400	18,997,371
Furniture,	26,224,750	14.41	40 20	1,054,280	5,214,650	21,010,100
Vehicles and vehicle parts,	7,873,867	4.33	35 48	279,372	4,968,100	2,905,767
Boxes and crates, packing,	7,604,877	4.18	16 08	122,249	1,949,877	5,655,000

Table 20—Concluded.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Ship and boat building,	6,305,400	3.46	34 92	220,206	3,410,900	2,894,500
Chairs and chair stock,	5,226,000	2.87	37 43	195,622	1,348,300	3,877,700
Fixtures,	4,228,000	2.32	50 63	214,086	813,100	3,414,960
Agricultural implements,	3,295,700	1.81	34 12	112,448	1,334,700	1,961,000
Machine construction,	2,923,600	1.61	26 59	77,749	2,558,600	365,000
Mine equipment,	2,827,772	1.55	17 22	48,697	2,827,772	.....
Caskets and coffins,	1,188,500	.65	50 02	59,452	132,500	1,056,000
Equipment, playground,	607,300	.33	33 65	20,437	314,800	292,500
Refrigerators and kitchen cabinets,	565,900	.31	32 82	18,571	250,000	315,900
Toys,	277,300	.15	28 32	7,852	232,800	44,500
Dairymen's, poultryers' and apiarists' supplies,	241,000	.13	20 26	4,883	200,000	41,000
Plumbers' woodwork,	219,500	.12	41 90	9,197	70,000	149,500
Instruments, musical,	190,000	.10	42 28	8,033	33,000	157,000
Baskets and veneer packages for fruit and vegetables,	125,000	.07	23 06	2,875	125,000	.....
Machinery and apparatus, electrical,	123,500	.07	33 08	4,085	10,000	113,500
Frames and moulding, picture, ..	119,000	.07	54 30	6,462	29,000	90,000
Insulator pins and brackets, ..	115,000	.06	12 61	1,450	115,000	.....
Saddles and harness,	78,000	.04	68 21	5,320	60,000	18,000
Handles,	74,000	.04	25 42	1,881	74,000	.....
Laundry appliances,	60,000	.03	23 50	1,410	20,000	40,000
Elevators,	53,200	.03	48 03	2,555	23,200	30,000
Tanks and silos,	50,000	.03	43 00	2,150	50,000	.....
Sporting and athletic goods,	42,000	.02	38 21	1,605	31,500	10,500
Patterns and flasks,	36,000	.02	34 67	1,248	36,000	.....
Shuttles, spools and bobbins, ..	35,000	.02	50 00	1,750	5,000	30,000
Woodenware and novelties,	27,100	.02	31 88	864	26,600	500
Manual training practice (sloyd),	23,570	.01	77 64	1,830	14,020	9,550
Pulleys and conveyors,	20,500	.01	28 05	575	20,500	.....
Rollers and curtain poles,	19,000	.01	16 63	316	19,000	.....
Clocks,	16,500	.01	68 97	1,138	.....	16,500
Instruments, professional and scientific,	10,000	.01	55 00	550	.....	10,000
Brushes,	600	*	37 00	22	600	.....
Total,	182,027,630	100.00	\$32 59	\$5,931,841	67,217,711	114,809,919

36.93% in. 63.07% out.

*Less than 1-100 of one per cent.

†The white and red oak groups have been combined in this table. In Part II of the Report the information is given separately.

YELLOW POPLAR.

(Liriodendron tulipifera).

Forty-one classes of factories demand yellow poplar, which next to sugar maple, shows the widest distribution among industries of any wood that Pennsylvania factories demand. In this particular it excels white oak. The number of particular uses (see table of uses) reported for yellow poplar, however, is nearly 50 per cent. less than for white oak, while the total poplar used in the State was less by forty million feet. Yellow poplar is of fine texture, more easily worked, takes paint readily, and holds its shape after drying better than any other domestic wood. In texture it is similar to basswood. Because it is frequently called whitewood it is often confused with basswood, but is softer. There is a great difference between the heartwood and the sapwood of yellow poplar; the former in a number of in-

stances being sold on the market as yellow poplar because of its yellow color, and the latter as white poplar or whitewood, and therefore number of instances being sold on the market as yellow poplar because of its yellow color, and the latter as white poplar or whitewood, and therefore often regarded by users as separate species. The tree is frequently called tulip tree and the wood tulip poplar. There is but one species of this genus in this country. It is interesting to note that of the total amount of yellow poplar going into manufacture, over thirteen million feet were cut from State-grown timber. This amount was about two million feet less than the reported cut of this species in the State.

Table 21.—Consumption of Yellow Poplar, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Boxes and crates, packing,	18,576,293	32.75	\$17 44	\$323,871	4,330,100	14,246,193
Planing mill products,	17,123,372	30.19	37 38	640,042	4,127,990	12,995,382
Vehicles and vehicle parts,	3,764,335	6.64	50 49	190,055	755,285	3,009,050
Car construction,	3,172,113	5.59	57 42	182,175	310,611	2,861,502
Furniture,	2,892,000	5.10	36 86	106,593	346,700	2,545,300
Fixtures,	2,237,000	3.94	37 21	83,229	167,500	2,069,500
Boards,	1,070,000	1.89	29 38	31,440	.....	1,070,000
Boxes, cigar,	1,040,928	1.84	75 31	78,465	24,500	1,017,428
Agricultural implements,	757,500	1.33	34 59	26,205	33,000	724,500
Caskets and coffins,	748,000	1.32	32 10	24,008	432,000	316,000
Toys,	702,000	1.24	25 48	17,888	659,500	42,500
Excelsior,	688,000	1.21	15 00	10,030	688,000	.....
Machine construction,	640,800	1.13	42 86	27,463	29,800	611,000
Laundry appliances,	610,000	1.07	16 44	10,030	500,000	110,000
Refrigerators and kitchen cabinets,	566,200	1.00	28 27	16,009	363,000	203,200
Woodenware and novelties,	482,500	.85	29 11	14,045	27,500	455,000
Shuttles, spools, and bobbins, ...	321,000	.51	36 50	11,715	25,000	296,000
Dairymen's, poulterers' and apiarists' supplies,	220,000	.39	29 82	6,500	.....	220,000
Brushes,	157,500	.28	40 68	6,407	32,500	125,000
Instruments, musical,	135,100	.24	70 54	9,530	24,000	111,100
Plumbers' woodwork,	134,000	.24	40 00	5,360	.....	134,000
Pumps,	100,000	.18	45 00	4,500	.....	100,000
Frames and moulding, pictures, ...	87,000	.15	38 51	3,350	.....	87,000
Ship and boat building,	84,000	.15	56 07	4,878	2,500	81,500
Elevators,	82,600	.14	41 88	3,459	30,600	52,000
Pulleys and conveyors,	80,000	.14	28 75	2,300	10,000	70,000
Patterns and flasks,	46,500	.08	38 82	1,805	37,500	9,000
Clocks,	35,000	.06	33 57	1,175	.....	35,000
Boot and shoe findings,	30,000	.05	56 67	1,700	.....	30,000
Equipment, playground,	25,000	.04	36 00	900	12,500	12,500
Chairs and chair stocks,	24,600	.04	38 05	936	.....	24,600
Instruments, professional and scientific,	16,400	.03	73 78	1,210	.....	16,400
Manual training practical (sloyd),	16,250	.03	56 95	1,088	9,550	6,700
Mine equipment,	14,000	.02	22 50	315	14,000	.....
Machinery and apparatus, electric,	10,000	.02	55 60	556	.....	10,000
Weighting apparatus,	10,000	.02	25 00	250	10,000	.....
Gates and fencing,	5,000	.01	26 00	130	5,000	.....
Printing material,	5,000	.01	18 00	90	.....	5,000
Sporting and athletic goods,	5,000	.01	28 00	140	5,000	.....
Ladders,	4,000	.01	21 00	84	.....	4,000
Rollers and poles,	1,000	*	65 00	65	.....	1,000
Total,	56,720,991	100.00	\$32 62	\$1,850,151	13,013,636	43,707,355

*Less than 1-100 of 1 per cent.

MAPLES.

Three maples are cut for lumber in Pennsylvania, sugar maple, sometimes called hard maple (*Acer saccharum*), the red or soft maple (*Acer rubrum*), and the white or silvery maple (*Acer saccharinum*). Of these the sugar maple is commercially the most important and it is probably the most valuable wood produced in Pennsylvania. This is because of the abundance of maple sugar it produces, the choice figured woods known as bird's eye and curly maple, etc., and the many uses for which this wood alone is the most adaptable, owing to its combined qualities or strength, hardness, stiffness, and its ability to hold its shape after being properly seasoned. Forty-two industries report its use, which is a greater number than for any other wood named in this report. It is abundant on well-drained land, particularly in the northern, western, and middle portions of the State. Next to white oak, sugar maple was reported as meeting the greatest number of uses, and was the fourth important hardwood in the total quantity used. It also bears the distinction, among the woods that are used in quantities exceeding 5,000,000 feet, of furnishing the largest proportion of State-grown wood.

Table 22.—Consumption of Sugar Maple, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Boxes and crates, packing,	11,647,000	21.19	\$16 43	\$191,340	3,282,500	8,364,500
Planing mill products,	9,681,890	17.62	23 75	229,963	8,673,090	1,008,800
Laundry appliances,	6,340,500	11.54	23 75	150,613	3,385,500	2,955,000
Chairs and chair stock,	5,348,100	9.73	18 54	99,180	4,746,500	601,600
Furniture,	4,743,900	8.63	26 72	126,632	3,640,100	1,103,800
Shuttles, spools, and bobbins, ...	2,528,000	4.60	24 85	62,816	1,870,000	658,000
Handles,	2,307,850	4.20	19 02	43,897	1,727,700	580,150
Car construction,	1,976,110	3.60	18 14	35,856	1,344,660	631,450
Brushes,	1,066,800	1.94	23 22	24,772	1,066,800	.....
Woodenware and novelties,	1,040,500	1.89	23 34	24,280	737,500	303,000
Agricultural implements,	1,032,600	1.88	28 04	28,952	365,500	667,100
Mine equipment,	790,200	1.44	18 67	14,751	790,200	.....
Toys,	762,500	1.39	25 31	19,390	712,500	50,000
Boards,	705,000	1.28	46 45	32,750	50,000	655,000
Instruments, musical,	647,800	1.18	32 20	20,877	225,300	422,500
Vehicles and vehicle parts,	625,800	1.14	28 67	17,940	314,200	311,600
Machinery and apparatus, electrical,	558,500	1.02	34 85	19,465	150,000	408,500
Baskets, fruit and vegetable, ...	549,000	1.00	18 15	9,963	549,000	.....
Pumps,	400,000	.72	17 00	6,800	400,000	.....
Fixtures,	366,000	.67	23 17	8,482	317,500	48,500
Machine construction,	288,700	.53	29 69	8,572	145,700	143,000
Butchers' blocks and skewers, ...	270,000	.49	20 37	5,500	270,000	.....
Whips, canes, and umbrella sticks,	241,100	.44	17 57	4,237	241,100	.....
Weighting apparatus,	171,000	.31	33 13	5,665	21,000	150,000
Dairymen's, poulterers' and apiarists' supplies,	152,950	.28	27 96	4,276	23,500	129,450
Elevators,	141,200	.26	49 74	7,023	81,200	60,000
Boot and shoe findings,	100,500	.18	55 86	5,614	.....	100,500
Sporting and athletic goods, ...	97,500	.17	36 14	3,524	47,500	50,000
Refrigerators and kitchen cabinets,	80,750	.15	28 71	2,318	80,750	.....
Pulleys and conveyors,	68,000	.12	43 68	2,970	66,000	2,000

Table 22—Concluded.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Patterns and flasks,	50,550	.09	47 46	2,399	38,850	11,700
Ladders,	50,000	.09	27 00	1,350	50,000	.....
Caskets and coffins,	35,000	.06	25 00	875	.....	35,000
Rollers and poles,	27,425	.05	16 59	455	27,000	425
Equipment, playground,	23,000	.04	26 96	620	3,000	20,000
Frames and moulding, picture,	20,000	.04	22 50	450	20,000	.....
Ship and boat building,	3,500	.01	29 14	103	2,500	1,000
Manual training practice (Sloyd),	3,350	.01	50 45	169	3,050	300
Instruments, professional and scientific,	930	.....	40 00	37	500	430
Printing material,	500	.....	80 00	40	500	.....
Plumbers' woodwork,	300	.....	30 00	9	.....	300
Miscellaneous,	11,500	.02	20 00	235	11,500	.....
Total,	54,955,805	100.00	\$22 29	\$1,225,049	35,482,200	19,473,605

Red and Silver Maple.

Red and silver maple both go in commerce under the name of soft maple. The former is cut from the hills and mountains of the State, where it grows abundantly and is associated with beech, birch, and hemlock, while the latter thrives best in bottomlands and along streams, in company with the willows, black ash, and river birch. The wood of these soft maples is similar to that of sugar maple except that it is lighter, softer, and slightly tougher. Relatively, they meet only a few uses and are distributed among only nineteen industries. Maple lumber, including all species, ranks next to oak in the hardwood cut of Pennsylvania.

Table 23.—Consumption of Red and Silver Maple, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Furniture,	1,478,500	25.89	\$25 49	\$37,682	730,500	748,000
Boxes and crates, packing,	1,267,000	22.18	12 38	15,685	872,000	395,000
Chairs and chair stock,	918,500	16.08	28 17	25,876	155,000	763,500
Toys,	450,000	7.88	24 00	10,800	450,000	.....
Shuttles, spools, and bobbins, ..	375,000	6.57	26 43	9,910	40,000	335,000
Fixtures,	260,000	4.55	15 09	3,900	260,000	.....
Woodenware and novelties,	210,525	3.68	14 43	3,038	210,525	.....
Brushes,	156,000	2.73	18 96	2,957	136,000	20,000
Baskets, fruit and vegetable, ..	145,000	2.54	20 06	2,900	.....	145,000
Whips, canes, and umbrella sticks,	107,000	1.87	26 45	2,830	2,000	105,000

Table 23—Concluded.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Laundry appliances,	80,000	1.40	25 00	1,990	42,500	37,500
Planing mill products,	71,750	1.26	26 19	1,879	31,750	40,000
Vehicles and vehicle parts,	47,000	.82	26 13	1,228	47,000	.....
Instruments, musical,	44,000	.77	26 82	1,180	.....	44,000
Printing material,	25,000	.44	31 60	790	20,000	5,000
Dairymen's, poultryers' and apiarists' supplies,	15,000	.26	10 00	150	15,000	.....
Pulleys and conveyors,	10,000	.18	14 00	140	10,000	.....
Patterns and flasks,	1,000	.02	55 00	55	1,000	.....
Miscellaneous,	50,000	.88	14 00	700	50,000	.....
Total,	5,711,275	100.00	\$21 66	\$123,690	3,073,275	2,638,000

CHESTNUT.

(Castanea dentata).

Over 1,000 sawmills in Pennsylvania report the cut of chestnut, and the production of this lumber exceeds that of any other hardwood cut in the State. Manufacturers, classified among twenty-seven industries, report chestnut for nearly 200 separate and distinct uses. Though Pennsylvania is second in importance in the production of chestnut lumber and annually cuts nearly twice as much as the manufacturers consume, only forty per cent. of the total quantity purchased was home-grown wood. The wood is coarse straight grained, light weight, moderately strong and hard, very stiff and brittle, durable when exposed, easily seasoned, and holds nails well. The wood is also rich in tannin and is therefore largely used in making tannin extracts. Its other valuable qualities are ease in working, great porosity, stiffness, non-elasticity, light weight, and brittleness. It has an attractive grain and a beautiful figure, and therefore has lately grown in popularity for inside finish of houses and buildings. Nearly two-thirds of the reported usage by manufacturers in Pennsylvania is for these and other planing mill products. The largest demand for chestnut is for rough forest products, as posts, telegraph poles, cross ties, mine props and tanning extract. The growing tree is subject to attacks by boring insects, which make the wood usually defective. Large quantities of the chestnut lumber used in Pennsylvania, therefore, are of the low grade known as "sound wormy" which shows the galleries of insect larvae, but is otherwise sound. It is this grade which the box makers use in amounts equal to more than twenty-three per cent. of the total, and it is this grade that the furniture manufacturers and piano builders demand for veneer backing, being light, holding its shape well, and with a special affinity for glue, and is especially adapted for this purpose. The casket makers use chestnut ahead of any other wood as experience has proved that this wood is one of the most durable underground. The sound wormy grade is most frequently employed as the injury by the borers does not seem to affect particularly its lasting qualities.

In recent years, the chestnut bark disease that has killed chestnut trees in New York and southern New England has made great inroads on the stand

in Pennsylvania. The rapid spread of the infection and its devastation in the infected areas of the State has produced such an alarming situation that the Commonwealth of Pennsylvania adopted measures looking to the possible control of the disease. A chestnut tree killed by the blight is killed by the girdling of the trunk. The disease does not injure the wood although it penetrates a few annual rings. The problem of utilizing the blight killed wood, the Federal Government has ascertained, is merely a question of using dead timber. The wood generally answers for all purposes for which healthy chestnut is demanded, and recent official strength tests have proved that sound killed chestnut is fully as strong as live healthy wood. To owners of blight killed timber, the Forest Service has pointed out the necessity of its use within two years after death as subsequent to that period, deterioration, due to checking, insect injury and decay, is quite rapid.

Table 24.—Consumption of Chestnut, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Planing mill products,	17,409,350	33.92	\$37 65	\$655 450	5,815,700	11,593,650
Boxes and crates,	11,977,692	23.34	16 04	192,165	6,275,328	5,702,364
Furniture,	11,556,850	22.52	19 52	225,599	5,586,300	5,970,550
Caskets and coffins,	5,387,000	10.50	20 57	110,807	1,573,500	3,813,500
Fixtures,	1,803,350	3.51	25 16	45,364	1,114,250	689,100
Mine equipment,	749,405	1.46	15 42	11,557	749,405	.....
Instruments, musical,	671,900	1.31	24 81	16,669	327,000	344,900
Toys,	500,000	.97	21 00	10,500	500,000	.....
Chairs and chair stock,	480,000	.94	17 71	8,499	95,000	385,000
Agricultural implements,	140,000	.27	19 07	2,670	40,000	100,000
Patterns, and flasks,	128,200	.25	19 24	2,466	47,500	80,700
Car construction,	113,250	.22	21 04	2,383	113,250	.....
Baskets, fruit and vegetable, ..	100,000	.19	19 00	1,900	100,000	.....
Frames and moulding, picture, ..	93,000	.18	22 41	2,084	25,000	68,000
Machine construction,	73,000	.14	35 67	2,604	28,000	50,000
Trunks and valises,	37,500	.07	25 00	938	17,500	20,000
Vehicles and vehicle parts,	30,200	.06	19 77	597	18,200	12,000
Tanks and silos,	15,000	.03	20 00	300	15,000	.....
Refrigerators and kitchen cabinets,	11,800	.02	28 05	331	11,800	.....
Gates and fencing,	11,500	.02	25 39	292	6,500	5,000
Sporting and athletic goods, ..	10,000	.02	33 00	330	5,000	5,000
Manual training practice (sloyd),	7,000	.01	64 14	448	5,000	2,000
Excelsior,	5,000	.01	14 00	70	5,000	.....
Clocks,	5,000	.01	30 00	150	5,000	.....
Elevators,	4,000	.01	70 00	280	.....	4,000
Ship and boat building,	3,100	.01	27 10	84	3,100	.....
Laundry appliances,	3,000	.01	24 00	72	2,000	1,000
Total,	51,326,097	100.00	\$25 22	\$1,294,609	22,479,333	28,846,764

43.80% in. 56.20% out.

BEECH.

(Fagus atropunicea)=(F. grandifolia).

Considering that thirty-three industries demand beech for more than 230 distinct uses, it can properly be termed one of Pennsylvania's important hardwoods, though not many years ago it was considered by manufacturers of little value. There is but one species in Pennsylvania and its stand is abund-

ant, especially in the northeastern, northern, and western portions of the State, where are located most of the 800 or more mills that report cutting it. Pennsylvania produces more beech lumber than any other state east of the Ohio river, and in this respect stands third in importance in the United States. It is quite surprising that so large a quantity of low grade beech lumber, such as is used by the box makers, was shipped in, if one considers that the cut of this wood in Pennsylvania exceeds the consumption of home-grown wood by over 22,000,000 feet. The wood of the beech tree is not first class lumber like its associates, the maples and birches. It is usually cross-grained, not durable, difficult to season, and frequently warps and checks when in place, even after it has been thoroughly dried. It is, however, strong, hard, and moderately stiff, and these qualities combined, together with the fact that it is cheap, make it desirable for a great number of uses. It is especially adapted for turning stock and for that reason it is one of the leading woods appearing in the chair industry and in the making of brooms and mop handles. The planing mills use it largely for flooring, but for this purpose it is not in so great demand in this State as in the New England states, where a large quantity of beech shipped from Pennsylvania is used, being preferred to the New England wood owing to its better quality. The brush makers want large quantities of beech for scrubbing and other cheap brush blocks, while the woodenware and toy makers demand it in large quantities for many special uses. It is the most important wood for laundry appliances, especially for clothes pins, for which it is used probably in larger quantities in the country at large than any other wood.

Table 25.—Consumption of Beech, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Boxes and crates, packing, ..	12,505,839	31.08	\$16 17	\$202,272	3,735,339	8,770,500
Chairs and chair stocks,	8,420,000	20.92	17 21	144,945	7,295,000	1,125,000
Woodenware and novelties,	3,639,000	9.04	20 46	74,446	3,356,000	283,000
Planing mill products,	2,461,750	6.12	16 35	40,250	1,972,250	489,500
Brushes,	1,931,000	4.80	18 87	36,430	1,931,000	.....
Handles,	1,752,300	4.35	17 31	30,412	1,302,800	449,500
Furniture,	1,453,000	3.61	16 23	23,584	1,397,000	56,000
Laundry appliances,	1,432,000	3.56	15 95	22,842	1,352,000	80,000
Car construction,	1,377,500	3.42	17 12	23,583	847,500	530,000
Frames and moulding, picture, ..	1,200,000	2.98	20 08	24,100	600,000	600,000
Baskets, fruit and vegetable, ..	1,079,000	2.68	18 62	20,093	949,000	130,000
Mine equipment,	656,525	1.63	17 94	11,781	656,525	.....
Toys,	627,400	1.56	18 41	11,553	585,000	42,400
Vehicles and vehicle parts,	587,883	1.46	21 97	12,916	537,883	50,000
Whips, canes, and umbrella sticks,	266,500	.66	21 91	5,838	252,000	14,500
Equipment, playground,	130,000	.32	29 46	3,830	130,000	.....
Excelsior,	116,500	.29	15 00	1,748	116,500	.....
Dairymen's, poulterers' and apiarists' supplies,	100,000	.25	16 00	1,600	100,000	.....
Fixtures,	71,000	.18	21 85	1,551	60,000	11,000
Refrigerators and kitchen cabinets,	55,000	.14	17 36	955	30,000	25,000

Table 25—Concluded.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Pumps,	50,000	.12	15 00	750	50,000	.....
Agricultural implements,	42,000	.10	22 86	960	32,000	10,000
Ladders,	22,000	.05	18 27	402	22,000	.....
Instruments, musical,	20,000	.05	22 00	440	.....	20,000
Sporting and athletic goods,	20,000	.05	17 25	345	20,000	.....
Pulleys and conveyors,	15,000	.04	20 00	300	15,000	.....
Rollers and poles,	12,000	.03	14 00	168	12,000	.....
Machine construction,	11,000	.03	14 55	160	11,000	.....
Patterns and flasks,	10,000	.03	25 00	250	10,000	.....
Ships and boat building,	2,500	.01	26 00	65	1,500	1,000
Printing material,	2,000	.01	30 00	60	2,000	.....
Manual training practice (sloyd),	600	.....	28 33	17	600	.....
Miscellaneous,	175,003	.43	14 86	2,600	175,003	.....
Total,	40,244,300	100.00	\$17 43	\$701,244	27,556,900	12,687,400

RED GUM.

(Liquidambar styraciflua).

Red gum in late years has grown in commercial importance more than any other domestic wood. It was formerly considered of little value, owing to difficulty in seasoning; but with the coming of improved methods of kiln-drying, both for veneer and lumber, these obstacles have been overcome and the wood has become available for a great number of uses. It was reported in Pennsylvania by twenty-three industries. The red gum tree grows in Pennsylvania, especially in the southeastern and middle portions of the State, where its cut was reported by 130 mills. It is not related, as its common name indicates, to the other gums, the water gum, and black gum, the cotton or tupelo gum, though often growing with them in the southern extension of its range. The red gum has a starlike leaf and bears its numerous seeds in spiny, round balls. The black gum has an oval leaf, and bears a small bluish black drupe containing a single seed. The wood of the red gum is fairly strong, soft and tough. It has a slightly interlocked grain, a fine, uniform texture, and takes a good polish. The color of the wood is not uniform. The sapwood is almost white and on the market is sold separately as sap gum. The heartwood is generally a reddish light brown. In some trees it is uniformly dark, while in others the dark wood runs in irregular streaks mottling the wood and giving it a figure resembling Circassian walnut. Pennsylvania furniture makers use this wood in the largest quantities, finishing it often to imitate more expensive hardwoods, mahogany, walnut, quarter-sawed oak, and cherry.

Table 26.—Consumption of Red Gum, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Boxes and crates, packing, ...	12,806,084	56.01	16 68	\$213,611	.....	12,806,084
Chairs and chair stock,	4,326,000	18.92	25 97	112,328	.....	4,326,000
Furniture,	2,297,000	10.05	34 25	78,666	.....	2,297,000
Planing mill products,	1,610,300	7.04	31 31	50,422	.....	1,610,300
Boxes, cigar,	549,750	2.41	49 79	27,373	.....	549,750
Vehicles and vehicle parts,	315,500	1.38	32 37	10,212	500	315,000
Woodenware and novelties,	225,000	.98	23 50	5,287	.....	225,000
Handles,	195,000	.85	29 38	5,730	.....	195,000
Mine equipment,	150,000	.66	12 00	1,800	.....	150,000
Fixtures,	94,000	.41	44 00	4,136	.....	94,000
Instruments, musical,	50,000	.22	51 20	2,560	.....	50,000
Frames and moulding, picture, ..	50,000	.22	30 00	1,500	.....	50,000
Brushes,	37,000	.16	27 00	999	.....	37,000
Car construction,	35,140	.15	27 02	950	.....	35,140
Caskets and coffins,	30,000	.13	40 00	1,200	.....	30,000
Agricultural implements,	24,000	.11	36 00	864	.....	24,000
Trunks and valises,	20,000	.09	35 00	700	.....	20,000
Whips, canes, and umbrella sticks,	20,000	.09	50 00	1,000	.....	20,000
Pipes, tobacco,	12,000	.05	50 00	600	.....	12,000
Clocks,	10,000	.04	60 00	600	.....	10,000
Toys,	5,000	.03	25 00	125	5,000	.....
Refrigerators and kitchen cabinets,	2,900	.01	50 00	145	.....	2,900
Manual training practice (sloyd),	470	.....	72 34	34	.....	370
Total,	22,865,144	100.00	\$22 78	\$520,842	5,500	22,859,644

BASSWOOD.

(Tilia americana).

Probably a larger per cent. of the cut of basswood in Pennsylvania goes to the manufacturers than that of any other hardwood. Four hundred and thirty mills in 1912 report cutting over 10,000,000 feet, while the wood-using factories consumed almost 8,000,000 feet, making more than 200 distinct commodities. There is one species of basswood of commercial importance growing in Pennsylvania, and it is found in all parts of the State, but more abundantly on rich, well drained soils. It is a favorite shade tree and for that purpose is extensively planted. Lumbermen often refer to the tree as linden and call the lumber "linn," but throughout its range it is probably most commonly known as basswood. This is due to the "bast" or inner bark, which is of considerable commercial importance for making cords, ropes, and doormats. Especially in midsummer is the tree easily identified, when the fragrant yellow flowers attract the attention of the passer-by.

Basswood is the softest hardwood and in its qualities is similar to yellow poplar and aspen. This wood is stiff, light, weak, and non-durable, with an intermediate grain, wide sapwood scarcely distinguishable, and a lack of taste and odor. It is more easily worked than any of the other hardwoods, with the probable exception of yellow poplar, does not warp or check, is tough, and takes paint well. It is used by thirty-one of the wood-using factories, besides being preferred by slack coopers over all other woods for heading, particularly flour and sugar barrels.

Table 27.—Consumption of Basswood, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Furniture,	3,945,400	21.10	\$35 13	\$138,592	1,105,400	2,840,000
Boxes and crates, packing,	2,936,400	15.70	16 93	49,708	1,324,400	1,612,000
Planing mill products,	2,738,576	14.65	30 97	84,811	1,396,900	1,341,676
Toys,	1,404,000	7.51	40 80	57,286	560,000	844,000
Trunks and valises,	1,374,500	7.35	27 80	38,209	754,500	620,000
Woodenware and novelties,	944,000	5.05	24 26	22,905	228,500	715,500
Frames and moulding, picture,...	902,000	4.82	23 09	20,825	352,000	550,000
Excelsior,	749,000	4.00	13 77	10,315	749,000	.....
Boxes, cigar,	495,000	2.65	64 95	32,150	.....	495,000
Vehicles and vehicle parts,	477,850	2.55	30 10	14,384	258,500	219,350
Laundry appliances,	437,000	2.34	32 52	14,210	108,500	328,500
Dairymen's, poulterers' and apiarists' supplies,	370,000	1.98	18 00	6,660	.....	370,000
Car construction,	366,010	1.96	40 74	14,911	140,214	225,796
Ladders,	275,000	1.47	29 18	8,025	150,000	125,000
Instruments, musical,	271,500	1.45	42 36	11,500	11,000	260,500
Fixtures,	269,100	1.44	33 92	9,128	176,100	93,000
Baskets, fruit and vegetable,...	220,000	1.18	20 18	4,440	220,000	.....
Ship and boat building,	150,000	.80	16 30	2,400	150,000	.....
Agricultural implements,	80,000	.43	31 06	2,485	30,000	50,000
Brushes,	42,300	.22	34 96	1,479	42,300	.....
Handles,	41,200	.22	29 73	1,225	41,200	.....
Pulleys and conveyors,	40,000	.21	20 00	800	40,000	.....
Rollers and poles,	37,500	.20	26 00	750	37,500	.....
Boot and shoe findings,	35,500	.19	50 73	1,801	18,000	17,500
Chairs and chair stock,	33,000	.18	22 12	730	25,000	8,000
Refrigerators and kitchen cabinets,	21,600	.12	31 11	672	1,600	20,000
Manual training practice (sloyd),	14,400	.08	43 06	590	7,650	6,750
Whips, canes, and umbrella sticks,	12,500	.07	32 48	406	5,000	7,500
Machine construction,	8,500	.04	36 47	310	500	8,000
Clocks,	5,000	.03	60 00	300	.....	5,000
Machinery and apparatus, electrical,	2,000	.01	55 60	111	.....	2,000
Total,	18,698,836	100.00	\$29 53	\$552,118	7,933,764	10,765,072

BIRCHES.

Three species of birch are of commercial importance in Pennsylvania. They are sweet or cherry birch, in Pennsylvania often called black birch (*Betula lenta*), well distributed throughout the State; yellow birch (*Betula lutea*), found mainly on altitudes associated with beech, maple, ash, and elm; and that called red or river birch (*Betula nigra*), of little commercial importance, inhabiting the banks of streams and rivers in all parts of the State. In 1912, the cut of birch in Pennsylvania exceeded by nearly 8,000,000 feet the quantity of State-grown lumber reported by the manufacturers, these factories drawing forty-three per cent. of their requirements from the producing regions of other States, principally New York and Vermont. Sweet birch lumber can be identified by the fact that its sapwood is nearly white and its heartwood red or nearly black. It is a fine wood, hard and strong, easily worked, takes a high polish, due, it is claimed, to the bright lining of the wood cells, and takes stains readily, which allows its use in imitation of more

expensive cabinet woods. It has an intermediate grain, is hard, dense, heavy, moderately stiff, tough and durable, rather difficult to season, hard to split, and rather easy to work. Curly birch is an accidental structure in the wood, due to cross grain corresponding to the similarly figured maples and is highly prized by cabinet makers and manufacturers of high class furniture. Yellow birch is also an excellent wood. Much of it is marketed with sweet birch without distinction. In Pennsylvania it was not possible to determine to what extent the two woods were desired for similar purposes, or for what uses the manufacturers preferred the one to the other; so accordingly they have been presented in this report under one name.

In vehicle making birch bolts are used extensively in competition with elm for hubs, and it is in this industry that the red or river birch finds its chief market. Birch lumber cut from river birch is usually of low grade and most of that used in Pennsylvania was reported by the box makers, who used birch of all species in larger amounts than any other industry. The planing mills and fixture makers demanded birch for interior trim in imitation of mahogany, and the furniture makers called for it for the same reason because it is the nearest approach to mahogany of any of the domestic woods.

Table 28.—Consumption of Birch, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Boxes and crates, packing,	5,999,000	32.19	\$16 76	\$100,556	2,488,500	3,510,500
Planing mill products,	4,493,442	24.11	39 84	179,033	2,138,844	2,354,598
Vehicles and vehicle parts,	1,514,500	8.13	48 11	72,864	455,000	1,059,500
Furniture,	1,138,270	6.11	29 10	33,126	525,900	612,370
Laundry appliances,	1,090,000	5.85	12 72	13,860	1,070,000	20,000
Chairs and chair stock,	992,400	5.33	30 05	29,824	583,500	408,900
Fixtures,	832,300	4.47	36 60	30,461	438,500	393,800
Toys,	617,000	3.31	23 84	14,708	617,000	.....
Woodenware and novelties,	466,500	2.50	25 95	12,105	230,000	236,500
Mine equipment,	336,075	1.80	24 23	8,143	336,075	.....
Car construction,	312,845	1.68	28 86	9,029	231,045	81,800
Handles,	207,750	1.11	18 13	3,766	205,250	2,500
Dairymen's, poulterers' and apiarists' supplies,	100,000	.54	18 00	1,800	100,000	.....
Plumbers' woodwork,	95,000	.51	30 95	2,940	75,000	20,000
Instruments, musical,	90,000	.48	23 89	2,150	50,000	40,000
Baskets, fruit and vegetable,...	70,000	.38	22 43	1,570	70,000	.....
Refrigerators and kitchen cabinets,	65,000	.35	25 15	1,635	30,000	35,000
Brushes,	51,000	.27	14 02	715	51,000	.....
Pumps,	50,000	.27	17 00	850	50,000	.....
Printing material,	30,000	.16	50 00	1,500	10,000	20,000
Agricultural implements,	20,000	.11	24 90	480	20,000	.....
Rollers and poles,	12,000	.06	14 00	168	12,000	.....
Pulleys and conveyors,	10,000	.05	20 00	200	10,000	.....
Frames and moulding, picture,	7,500	.04	75 00	562	.....	7,500
Clocks,	4,000	.02	45 00	180	.....	4,000
Machine construction,	3,000	.02	25 00	75	3,000	.....
Pipes, tobacco,	2,000	.01	50 00	100	.....	2,000
Caskets and coffins,	1,000	.01	24 00	24	1,000	.....
Miscellaneous,	25,000	.13	14 00	350	25,000	.....
Total,	18,635,582	100.00	\$28 05	\$522,774	9,826,614	8,808,963

THE HICKORIES.

Two industries in Pennsylvania, vehicle parts and handles, together use nearly five-sixths of the 18,000,000 feet of hickory going into products of final manufacture. The remainder is divided in varying small amounts among eighteen industries, of which car building, making of mine sprags, and machine construction are the principal ones. On account of the variety of special uses for which hickory is demanded, a large amount of waste is occasioned, both in the preparation of the raw material as well as in the finished commodity. This waste probably exceeds that of any other valuable hardwood.

Six species of hickory grow in Pennsylvania and some of them are found more or less generally throughout the State. In the tree they can be readily identified by their botanical characteristics, but when cut into lumber the species are difficult to distinguish. The information available to guide in their separation was so meager that they are therefore presented in this report under the generic name hickory. The growing scarcity of hickory, together with the fact that no suitable substitutes have been found for it in a number of its special uses, accounts for the high average price the manufacturers paid for it. Apart from its scarcity, the wood is a most valuable one, owing to its combination of qualities of extraordinary hardness, strength, toughness, and flexibility. No such combination exists in any other domestic hardwood. Further, it has a straight grain, is moderately elastic, hard to split, and very perishable; it is a difficult wood to season and to work and to be made to hold its shape.

Table 29.—Consumption of Hickory, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Vehicles and vehicle parts, ..	10,819,552	60.60	\$48 51	\$524,895	3,642,252	7,177,300
Handles,	3,973,350	22.26	31 97	127,045	2,509,300	1,374,050
Car construction,	1,115,306	6.25	24 50	27,325	343,697	771,609
Mine equipment,	816,363	4.57	13 51	11,031	816,363	.....
Machine construction,	695,000	3.91	27 27	19,063	643,000	56,000
Agricultural implements,	124,400	.70	33 41	4,156	99,400	25,000
Planing mill products,	80,100	.45	27 93	2,165	70,100	10,000
Shuttles, spools, and bobbins, ..	63,000	.35	46 98	2,960	30,000	33,000
Butchers' blocks and skewers, ..	50,000	.28	18 00	900	50,000	.....
Ship and boat building,	28,000	.16	65 00	1,820	26,500	1,500
Whips, canes, and umbrella sticks,	26,000	.15	55 85	1,452	.....	26,000
Ladders,	25,000	.14	18 00	450	25,000	.....
Chairs and chair stock,	15,000	.08	17 20	258	15,000	.....
Saddles and harness,	10,000	.06	60 00	600	.....	10,000
Rollers and poles,	2,500	.01	60 00	150	2,500	.....
Woodenware and novelties,	2,500	.01	60 00	150	2,500	.....
Fixtures,	1,000	.01	65 00	65	1,000	.....
Manual training practice (sloyd),	934	.01	70 66	64	234	700
Furniture,	750	.....	81 33	61	250	500
Printing material,	500	.....	50 00	25	500	.....
Total,	17,853,255	100.00	\$40 59	\$724,635	8,367,596	9,485,659

THE ASHES.

Ash is one of the most widely distributed of the North American trees. It ranges from the Rocky Mountain states eastward through every state but Maine, and the fact that 606 Pennsylvania sawmills in 1912 reported cutting this wood, indicates that the tree is also well distributed throughout this State. Manufacturers do not distinguish the species for particular uses but, like the oaks, they separate them into classes, white ash and black ash. In Pennsylvania the white ash (*Fraxinus americana*) and black ash (*Fraxinus nigra*) are the most important commercial species of ash growing within the State and they make up the bulk of the material which the Pennsylvania manufacturers consume. The white ash is one of Pennsylvania's valuable hardwoods. It possesses a coarse, straight grain, fine texture, is moderately hard and strong, besides being rather resilient and tough. However, it lacks durability. The manufacture of vehicle parts, handles, agricultural implements, boats, sporting goods, and framework of various kinds where the qualities of strength and toughness are desired call principally for white ash, both in Pennsylvania and the country at large.

The uses of black ash are quite different from those of the white ash because of its different qualities. It is much softer, not as strong or as elastic, and is more durable. Black ash has a pronounced attractive figure and is more desirable for decorative work. It is, therefore, called on to meet large demands for interior finish of houses, railroad and trolley cars. The lack of taste and odor makes ash valuable for containers of foodstuffs, such as butter tubs, woodenware, flour barrels, and boxes of various kinds. Only forty-six per cent. of the ash going into further manufacture was State-grown, in spite of the fact that the lumber cut exceeded by over 4,000,000 feet the amount of home-grown material used.

Table 30.—Consumption of Ash, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Car construction,	4,396,915	30.74	\$56 70	\$249,311	933,908	3,463,007
Vehicles and vehicle parts, ..	3,590,472	25.10	43 16	158,564	2,096,204	1,494,268
Handles,	1,969,750	13.77	28 45	56,032	1,130,750	839,000
Planing mill products,	791,315	5.53	51 89	41,062	533,165	258,150
Woodenware and novelties,	634,500	4.43	30 67	19,462	259,500	375,000
Agricultural implements,	599,100	4.19	38 73	23,202	103,100	496,000
Dairymen's, poultrymen's and apiarists' supplies,	400,000	2.80	15 60	6,000	395,000	5,000
Ship and boat building,	388,700	2.72	41 47	16,118	262,700	126,000
Toys,	320,000	2.24	42 03	13,450	182,500	137,500
Furniture,	175,500	1.23	28 43	4,939	82,500	93,000
Plumbers' woodwork,	110,000	.77	34 00	3,740	.....	110,000
Chairs and chair stock,	104,300	.73	24 54	2,559	37,300	67,000
Saddles and harness,	100,000	.70	44 80	4,480	76,000	24,000
Elevators,	93,000	.65	71 17	6,619	43,600	49,400
Trunks and valises,	87,500	.61	36 42	3,187	87,500	.....
Machine construction,	83,000	.58	44 88	3,725	5,000	78,000
Equipment, playground,	75,000	.53	33 00	2,475	37,500	37,500
Boxes and crates, packing, ..	54,200	.38	23 51	1,274	53,500	700
Fixtures,	49,900	.35	58 62	2,925	41,000	8,900
Mine equipment,	43,425	.30	22.01	956	43,425	.....

Table 30—Concluded.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.		Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.		
Refrigerators and kitchen cabinets,	32,000	.22	38 19	1,222	4,000		28,000
Baskets, fruit and vegetable, ..	30,000	.21	21 00	630	30,000		
Sporting and athletic goods, ..	30,000	.21	66 83	2,005	30,000		
Machinery and apparatus, electrical,	25,000	.17	60 00	1,500			25,000
Instruments, professional and scientific,	15,000	.10	58 67	880	5,000		10,000
Pulleys and conveyors,	15,000	.10	30 00	450	7,000		8,000
Brushes,	12,600	.09	34 29	432	12,600		
Frames and moulding, picture, ..	10,000	.07	35 00	350	10,000		
Rollers and poles,	6,150	.04	32 68	201	5,000		1,150
Instruments, musical,	5,300	.04	44 34	235	5,000		300
Ladders,	4,000	.03	70 00	280	4,000		
Manual training practice (sloyd), ..	1,100	.01	70 91	78	300		800
Laundry appliances,	1,000	.01	25 00	25	1,000		
Weighing apparatus,	900	.01	93 06	84	900		
Miscellaneous,	50,000	.35	25 00	1,250	50,000		
Total,	14,304,627	100.00	\$44 02	\$629,752	6,568,952		7,735,675

45.92% in. 54.08% out.

THE ELMS.

Only two species of elm were reported by the Pennsylvania wood users, white elm (*Ulmus americana*) and cork elm (*Ulmus racemosa*); but it is possible that small quantities of slippery elm (*Ulmus pubescens*)=(*U. fulva*) were used, but because it is cut in this State in only small quantities it is usually marketed mixed with white elm and, therefore, was not identified and reported separately. Cork elm is the most valuable of the three elms because the wood is most durable, but white elm in Pennsylvania is the most abundant species and composes the largest proportion of the 3,000,000 feet of elm that the Pennsylvania sawmills cut in 1912. Elm, irrespective of species, is one of the strongest and most elastic hardwoods growing in Pennsylvania. In addition to being heavy, tough, hard, and dense, it is hard to work and difficult to season. The two species reported are together demanded by 16 industries. The largest amount of the cork elm went to the vehicle maker, while the chair industry was foremost in demanding the white elm. The trunk makers also bid for a large amount of this wood for slat material.

Table 31.—Consumption of Elm*, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.		Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.		
Chairs and chair stock,	6,213,500	59.85	\$26 76	\$166,243	62,000		6,151,500
Trunks and valises,	1,837,500	17.70	30 82	56,625	250,000		1,587,500
Dairymen's, poultryers' and ap- parists' supplies,	600,000	5.78	25 00	15,000	250,000		350,000
Woodenware and novelties, ...	500,000	4.83	28 00	14,000			500,000
Vehicles and vehicle parts, ...	484,400	4.67	35 92	17,398	95,800		388,600
Boxes and crates, packing,	429,800	4.14	24 20	10,400	132,300		297,500
Baskets and veneer packages for fruit and vegetables,	115,000	1.11	21 87	2,515	115,000		
Car construction,	63,343	.61	49 43	3,131			63,343
Agricultural implements,	50,000	.48	25 00	1,250	50,000		
Elevators,	32,500	.31	64 98	2,112	20,500		12,000
Toys,	25,000	.24	21 00	525	12,500		12,500
Patterns and flasks,	15,000	.14	33 00	495			15,000
Mine equipment,	8,800	.08	26 14	230	8,800		
Planing mill products,	4,000	.04	23 00	92	4,000		
Machine construction,	2,000	.02	50 00	100			2,000
Total,	10,380,843	100.00	\$27 95	\$290,116	1,000,900		9,379,943

9.64% in. 90.36% out.

*The white and cork elm groups have been combined in this table. In Part II of this report the information is given separately.

COTTONWOOD.

(*Populus deltoides*).

Cottonwood belongs to a widely distributed tree family, which includes the willows, aspen, balm of gilead, and other poplars (not yellow poplar). The cottonwood referred to in this report is the *Populus deltoides*, the tree found in large sizes and most abundant in the lower Mississippi Valley. It grows in moist soil in almost all the states east of the Rocky Mountains. Owing to the difficulty in seasoning cottonwood, it is better adapted for veneer than lumber. Yellow and white cottonwood are often distinguished in trade. The former refers to the heartwood, the latter to the light colored sapwood of the tree. However, the amount consumed for veneer production in the United States is only about 10 per cent. of the lumber cut. The manufacturers of built up lumber used this wood in large amounts as veneer. On account of its qualities of toughness, flexibility, and its capacity for being easily worked, it is especially adapted for bent work as in vehicle bodies and auditorium chairs. It is also popular with trunk makers for trunk boxes and tops. The lumber serves many uses as a substitute for basswood and yellow poplar, and, like these woods, is light, weak, and non-durable; but of fine even texture and a lack of taste and odor. The last two named qualities commend it as a material for food containers, while for packing cases and crates its other excellent qualities, combined with its whitish color, make it especially desirable as a background for printing and stenciling. This tree is not commonly cut in Pennsylvania, which accounts for the fact that only about one and one-half per cent. of the total amount used was State-grown. Eleven industries

together demand over six and one-third million feet of cottonwood, of which 74 per cent. is used by the box industry, nearly 8 per cent. for laundry appliances, and 6 per cent. by the furniture makers.

Table 32.—Consumption of Cottonwood, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Boxes and crates, packing,	4,680,000	73.86	\$24 60	\$115,135	40,000	4,640,000
Laundry appliances,	500,000	7.89	32 90	16,450	.....	500,000
Furniture,	380,000	6.00	34 87	13,250	.....	380,000
Planing mill products,	330,000	5.21	25 36	8,370	.....	330,000
Trunks and valises,	177,350	2.80	37 95	6,731	.....	177,350
Refrigerators and kitchen cabinets,	150,000	2.37	32 00	4,800	.....	150,000
Vehicles and vehicle parts,	64,000	1.01	34 38	2,200	24,000	40,000
Fixtures,	40,000	.63	38 50	1,540	20,000	20,000
Sporting and athletic goods, ..	10,000	.16	32 00	320	.....	10,000
Dairymen's, poultryers' and apiarists' supplies,	2,500	.04	40 00	100	2,500	.....
Pulleys and conveyors,	2,000	.03	21 00	42	2,000	.....
Total,	6,335,850	100.00	\$26 6¢	\$168,938	88,500	6,247,350

THE GUMS.

Black gum is the common name given in various states to three trees, black or sour gum (*Nyssa sylvatica*), cotton gum or tupelo (*Nyssa aquatica*), and water gum (*Nyssa biflora*), all belonging to the dogwood family. Red gum, though it bears the name of "gum" does not belong to the same family and, therefore, has been discussed under a separate heading. One of the above named species, the black or sour gum, grows within the State. It is found in wet lowlands and along the slopes of the foothills and mountains. It is not abundant and only a little over 5 per cent. of the total of nearly 5,000,000 feet used by 11 industries is State-grown wood. It attracts attention by its bright green summer foliage, which in the autumn turns to brilliant yellow and red, and also by its clusters of two or three oblong berries of bluish black color and sour taste. The wood of this tree has an interlaced fiber and is difficult to split and work; hence it is valuable for certain special uses, such as vehicle hubs, pulleys, mine rollers, mauls, mallets, and cogs. In the South it is cut into veneer and goes into wooden dishes, berry cups, fruit baskets, and veneer boxes.

Table 33.—Consumption of Black Gum, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Boxes and crates, packing,	3,089,800	62.33	\$15 36	\$47,463	.....	3,089,800
Mine equipment,	1,628,460	32.85	24 37	39,678	219,216	1,409,244
Vehicles and vehicle parts,	181,800	3.67	37 57	6,831	31,500	150,300
Baskets, fruit and vegetable, ...	20,000	.41	22 00	440	20,000	.....
Pulleys and conveyors,	14,000	.28	33 71	472	.....	14,000
Instruments, professional and scientific,	12,000	.24	52 83	634	2,000	10,000
Rollers and poles,	6,000	.12	20 00	120	.....	6,000
Ship and boat building,	3,000	.06	70 00	210	.....	3,000
Fixtures,	1,000	.02	28 00	28	.....	1,000
Car construction,	600	.01	58 00	35	.....	600
Patterns and flasks,	500	.01	24 00	12	.....	500
Total,	4,957,160	100.00	\$19 34	\$95,923	272,716	4,684,444

Cotton Gum (*Nyssa aquatica*).

Most of the cotton gum or tupelo lumber came from Virginia and the Carolinas. It grows only on the swamps and lowlands and in lumber can be distinguished from the black (sour) gum by its darker yellowish hue, its tendency to split straight, besides being soft and more easily worked. Nearly 6,000,000 feet of this wood is demanded by eight industries. The box makers use most of it. Cigar box material also claims a fairly large amount. The two industries together consume 92 per cent. of the total.

Table 34.—Consumption of Cotton Gum, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Boxes and crates,	3,458,722	58.05	\$14 13	\$48,873	.....	3,458,722
Boxes, cigar,	2,043,917	34.31	63 37	129,519	.....	2,043,917
Furniture,	236,500	3.97	33 54	7,933	.....	236,500
Planing mill products,	151,648	2.54	26 55	4,027	.....	151,648
Agricultural implements,	35,000	.59	36 00	1,260	.....	35,000
Instruments, musical,	20,000	.34	25 00	500	.....	20,000
Woodenware and novelties,	6,900	.12	20 00	138	.....	6,900
Toys,	5,000	.08	20 00	100	.....	5,000
Total,	5,957,687	100.00	\$32 29	\$192,350	.....	5,957,687

CHERRY.

(Prunus serotina).

In the lumber cut of cherry, Pennsylvania is second only to West Virginia. Notwithstanding the fact that the production of cherry in Pennsylvania is nearly 5,000,000 feet more than the consumption, one-third of the requirements of the manufacturers was supplied by the forests of other states. Black cherry is the only cherry species used commercially. Its technical quality is high in that it combines strength and hardness, a fine straight grain, compact structure, and stability. It also takes a fine polish and excels most other hardwoods in its capacity to hold its shape. It is this quality which commends it for electrotpe backing. In Pennsylvania this is its chief use. The car manufacturers give it preference over any other domestic wood for the best grade interior finish of passenger coaches. It is a favorite with the fixture and furniture manufacturers. The qualities, in addition to those mentioned above, are durability, stiffness, density, and ease in splitting. It is somewhat brittle, with a fine, straight grain.

Table 35.—Consumption of Black Cherry, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Printing material,	1,166,800	42.84	\$29 14	\$34,003	634,000	532,800
Brushes,	482,900	17.73	25 43	12,282	482,900	.....
Car construction,	431,414	15.84	60 59	26,140	216,951	214,463
Planing mill products,	177,385	6.51	64 48	11,438	110,085	67,300
Fixtures,	128,700	4.73	66 14	8,512	83,250	45,450
Furniture,	113,900	4.18	34 74	3,957	105,600	8,300
Patterns and flasks,	86,894	3.19	71 58	6,220	54,644	32,250
Boxes and crates, packing,	70,000	2.57	19 00	1,330	70,000	.....
Caskets and coffins,	20,000	.73	60 00	1,200	20,000	.....
Instruments, professional and scientific,	10,000	.37	100 00	1,000	.....	10,000
Handles,	7,500	.28	50 00	375	2,500	5,000
Refrigerators and kitchen cabinets,	7,500	.28	62 50	469	7,500	.....
Weighing apparatus,	7,500	.28	27 90	202	7,500	.....
Instruments, musical,	4,400	.16	75 68	333	3,600	800
Plumbers' woodwork,	4,400	.16	94 55	416	400	4,000
Vehicles and vehicle parts,	2,250	.08	91 56	206	2,000	250
Manual training practice (sloyd),	1,850	.07	55 68	103	1,850	.....
Storing and athletic goods, ..	100	.....	46 00	5	100	.....
Total,	2,723,493	100.00	\$39 73	\$108,191	1,802,880	920,613

BLACK WALNUT.

(Juglans nigra).

The cut of black walnut in Pennsylvania is equal to three times the total consumed by the factories and five times the quantity of the home grown wood that they report. Black walnut is the most expensive hardwood native to Pennsylvania and was demanded by 17 industries. It is very durable, easy to work, hard, porous, strong, stiff, heavy, stable in place, non-elastic, and with an intermediate straight grain. The makers of caskets and coffins used

the most, followed by the manufacturers of organs and furniture, using nearly equal quantities, and by 14 other industries demanding varying smaller amounts.

Table 36.—Consumption of Black Walnut, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Caskets and coffins,	214,000	27.35	\$59 50	\$12,732	182,000	32,000
Instruments, musical,	131,200	16.77	44 05	5,779	67,700	63,500
Furniture,	130,000	16.61	95 04	12,365	21,000	109,000
Planing mill products,	77,265	9.87	111 31	8,600	52,365	24,900
Car construction,	56,890	7.27	101 13	5,753	980	55,910
Chairs and chair stock,	50,000	6.39	66 08	3,304	44,000	6,000
Fixtures,	35,860	4.53	82 91	2,973	28,860	7,000
Clocks,	21,000	2.68	50 95	1,070	21,000	.....
Patterns and flasks,	14,500	1.85	50 00	725	4,500	10,000
Frames and mouldings, picture, ..	10,500	1.34	80 67	847	4,500	6,000
Machinery and apparatus, electrical,	2,500	.32	40 00	100	2,500	.....
Vehicles and vehicle parts,	1,400	.18	91 42	128	1,100	300
Handles,	1,050	.14	81 90	86	1,050	.....
Brushes,	1,000	.13	80 00	80	1,000	.....
Manual training practice (sloyd), ..	850	.11	87 06	77	650	200
Plumbers' woodwork,	300	.01	35 00	10	300	.....
Miscellaneous,	34,200	4.37	71 31	2,456	10,200	24,000
Total,	782,615	100.00	\$72 94	\$57,085	443,705	338,910

SYCAMORE.

(Platanus occidentalis).

Not more than 4½ per cent. of the requirements of the Pennsylvania wood-users was drawn from the State-grown sycamore. This is not surprising, as this species is not an important lumber tree in this State. Sycamore's fine grain revealed by rift sawing and its rich color commend its use for cabinet work. It has a coarse, distinct grain, somewhat contorted, and is hard, heavy, stiff, hard to split, moderately strong and durable, difficult to season and to work, and unstable in holding its shape. Forty-two mills report it, but only in small quantities. Probably the most exacting use of this wood in the country at large is for butcher blocks, but in Pennsylvania none of the manufacturers report using it for that purpose. The chair makers demanded the most that was used, almost 72 per cent. of the total, while the rest was about equally distributed among five other industries, the brush makers being the most important.

Table 30—Concluded.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Refrigerators and kitchen cabinets,	32,000	.32	28 19	1,222	4,000	28,000
Baskets, fruit and vegetable, ..	30,000	.21	21 00	630	30,000	.....
Sporting and athletic goods, ..	30,000	.21	66 83	2,005	30,000	.....
Machinery and apparatus, electrical,	25,000	.17	60 00	1,500	.....	25,000
Instruments, professional and scientific,	15,000	.10	58 67	880	5,000	10,000
Pulleys and conveyors,	15,000	.10	30 00	450	7,000	8,000
Brushes,	12,600	.09	34 29	432	12,600	.....
Frames and moulding, picture, ..	10,000	.07	35 00	350	10,000	.....
Rollers and poles,	6,150	.04	32 68	201	5,000	1,150
Instruments, musical,	5,300	.04	44 34	235	5,000	300
Ladders,	4,000	.03	70 00	280	4,000	.....
Manual training practice (sloyd), ..	1,100	.01	70 91	78	300	800
Laundry appliances,	1,000	.01	25 00	25	1,000	.....
Weighing apparatus,	900	.01	93 06	84	900	.....
Miscellaneous,	50,000	.35	25 00	1,250	50,000	.....
Total,	14,304,627	100.00	\$44 02	\$629,732	6,568,952	7,735,675

45.92% in. 54.08% out.

THE ELMS.

Only two species of elm were reported by the Pennsylvania wood users, white elm (*Ulmus americana*) and cork elm (*Ulmus racemosa*); but it is possible that small quantities of slippery elm (*Ulmus pubescens*)=(*U. fulva*) were used, but because it is cut in this State in only small quantities it is usually marketed mixed with white elm and, therefore, was not identified and reported separately. Cork elm is the most valuable of the three elms because the wood is most durable, but white elm in Pennsylvania is the most abundant species and composes the largest proportion of the 3,000,000 feet of elm that the Pennsylvania sawmills cut in 1912. Elm, irrespective of species, is one of the strongest and most elastic hardwoods growing in Pennsylvania. In addition to being heavy, tough, hard, and dense, it is hard to work and difficult to season. The two species reported are together demanded by 16 industries. The largest amount of the cork elm went to the vehicle maker, while the chair industry was foremost in demanding the white elm. The trunk makers also bid for a large amount of this wood for slat material.

Table 31.—Consumption of Elm*, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Chairs and chair stock,	6,213,500	59.85	\$26 76	\$166,243	62,000	6,151,500
Trunks and valises,	1,837,500	17.70	30 82	56,625	250,000	1,587,500
Dairymen's, poultryers' and apiculturists' supplies,	600,000	5.78	25 00	15,000	250,000	350,000
Woodenware and novelties, ..	500,000	4.83	28 00	14,000	.....	500,000
Vehicles and vehicle parts, ...	484,400	4.67	35 92	17,398	95,800	388,600
Boxes and crates, packing,	429,800	4.14	24 20	10,400	132,300	297,500
Baskets and veneer packages for fruit and vegetables,	115,000	1.11	21 87	2,515	115,000	.....
Car construction,	63,343	.61	49 43	3,131	.....	63,343
Agricultural implements,	50,000	.48	25 00	1,250	50,000	.....
Elevators,	32,500	.31	64 98	2,112	20,500	12,000
Toys,	25,000	.24	21 00	525	12,500	12,500
Patterns and flasks,	15,000	.14	33 00	495	.....	15,000
Mine equipment,	8,800	.08	26 14	230	8,800	.....
Planing mill products,	4,000	.04	23 00	92	4,000	.....
Machine construction,	2,000	.02	50 00	100	.....	2,000
Total,	10,380,843	100.00	\$27 95	\$290,116	1,000,900	9,379,943

9.64% in. 90.36% out.

*The white and cork elm groups have been combined in this table. In Part II of this report the information is given separately.

COTTONWOOD.

(Populus deltoides).

Cottonwood belongs to a widely distributed tree family, which includes the willows, aspen, balm of gilead, and other poplars (not yellow poplar). The cottonwood referred to in this report is the *Populus deltoides*, the tree found in large sizes and most abundant in the lower Mississippi Valley. It grows in moist soil in almost all the states east of the Rocky Mountains. Owing to the difficulty in seasoning cottonwood, it is better adapted for veneer than lumber. Yellow and white cottonwood are often distinguished in trade. The former refers to the heartwood, the latter to the light colored sapwood of the tree. However, the amount consumed for veneer production in the United States is only about 10 per cent. of the lumber cut. The manufacturers of built up lumber used this wood in large amounts as veneer. On account of its qualities of toughness, flexibility, and its capacity for being easily worked, it is especially adapted for bent work as in vehicle bodies and auditorium chairs. It is also popular with trunk makers for trunk boxes and tops. The lumber serves many uses as a substitute for basswood and yellow poplar, and, like these woods, is light, weak, and non-durable; but of fine even texture and a lack of taste and odor. The last two named qualities commend it as a material for food containers, while for packing cases and crates its other excellent qualities, combined with its whitish color, make it especially desirable as a background for printing and stenciling. This tree is not commonly cut in Pennsylvania, which accounts for the fact that only about one and one-half per cent. of the total amount used was State-grown. Eleven industries

together demand over six and one-third million feet of cottonwood, of which 74 per cent. is used by the box industry, nearly 8 per cent. for laundry appliances, and 6 per cent. by the furniture makers.

Table 32.—Consumption of Cottonwood, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Boxes and crates, packing,	4,680,000	73.86	\$24 60	\$115,135	40,000	4,640,000
Laundry appliances,	500,000	7.89	32 90	16,450	.....	500,000
Furniture,	380,000	6.00	34 87	13,250	.....	380,000
Planing mill products,	330,000	5.21	35 36	8,370	.....	330,000
Trunks and valises,	177,350	2.80	37 95	6,731	.....	177,350
Refrigerators and kitchen cabinets,	150,000	2.37	32 00	4,800	.....	150,000
Vehicles and vehicle parts,	64,000	1.01	34 38	2,200	24,000	40,000
Fixtures,	40,000	.63	38 50	1,540	20,000	20,000
Sporting and athletic goods, ..	10,000	.16	32 00	320	.....	10,000
Dairymen's, poultryers' and apiarists' supplies,	2,500	.04	40 00	100	2,500	.....
Pulleys and conveyors,	2,000	.03	21 00	42	2,000	.....
Total,	6,335,850	100.00	\$26 66	\$168,938	88,500	6,247,350

THE GUMS.

Black gum is the common name given in various states to three trees, black or sour gum (*Nyssa sylvatica*), cotton gum or tupelo (*Nyssa aquatica*), and water gum (*Nyssa biflora*), all belonging to the dogwood family. Red gum, though it bears the name of "gum" does not belong to the same family and, therefore, has been discussed under a separate heading. One of the above named species, the black or sour gum, grows within the State. It is found in wet lowlands and along the slopes of the foothills and mountains. It is not abundant and only a little over 5 per cent. of the total of nearly 5,000,000 feet used by 11 industries is State-grown wood. It attracts attention by its bright green summer foliage, which in the autumn turns to brilliant yellow and red, and also by its clusters of two or three oblong berries of bluish black color and sour taste. The wood of this tree has an interlaced fiber and is difficult to split and work; hence it is valuable for certain special uses, such as vehicle hubs, pulleys, mine rollers, mauls, mallets, and cogs. In the South it is cut into veneer and goes into wooden dishes, berry cups, fruit baskets, and veneer boxes.

Table 33.—Consumption of Black Gum, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Boxes and crates, packing,	3,089,800	62.33	\$15 36	\$47,463	.....	3,089,800
Mine equipment,	1,628,460	32.85	24 37	39,678	219,216	1,409,244
Vehicles and vehicle parts,	181,800	3.67	37 57	6,831	31,500	150,300
Baskets, fruit and vegetable, ..	20,000	.41	22 00	440	20,000	.....
Pulleys and conveyors,	14,000	.28	33 71	472	.....	14,000
Instruments, professional and scientific,	12,000	.24	52 83	634	2,000	10,000
Rollers and poles,	6,000	.12	20 00	120	.....	6,000
Ship and boat building,	3,000	.06	70 00	210	.....	3,000
Fixtures,	1,000	.02	28 00	28	.....	1,000
Car construction,	600	.01	58 00	35	.....	600
Patterns and flasks,	500	.01	24 00	12	.....	500
Total,	4,957,160	100.00	\$19 34	\$95,923	272,716	4,684,444

Cotton Gum (*Nyssa aquatica*).

Most of the cotton gum or tupelo lumber came from Virginia and the Carolinas. It grows only on the swamps and lowlands and in lumber can be distinguished from the black (sour) gum by its darker yellowish hue, its tendency to split straight, besides being soft and more easily worked. Nearly 6,000,000 feet of this wood is demanded by eight industries. The box makers use most of it. Cigar box material also claims a fairly large amount. The two industries together consume 92 per cent. of the total.

Table 34.—Consumption of Cotton Gum, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Boxes and crates,	3,458,722	58.05	\$14 13	\$48,873	.....	3,458,722
Boxes, cigar,	2,043,917	34.31	63 37	129,519	.....	2,043,917
Furniture,	236,500	3.97	33 54	7,933	.....	236,500
Planing mill products,	151,648	2.54	26 55	4,027	.....	151,648
Agricultural implements,	35,000	.59	36 00	1,260	.....	35,000
Instruments, musical,	20,000	.34	25 00	500	.....	20,000
Woodenware and novelties,	6,900	.12	20 00	138	.....	6,900
Toys,	5,000	.08	20 00	100	.....	5,000
Total,	5,957,687	100.00	\$32 29	\$192,350	.....	5,957,687

CHERRY.

(Prunus serotina).

In the lumber cut of cherry, Pennsylvania is second only to West Virginia. Notwithstanding the fact that the production of cherry in Pennsylvania is nearly 5,000,000 feet more than the consumption, one-third of the requirements of the manufacturers was supplied by the forests of other states. Black cherry is the only cherry species used commercially. Its technical quality is high in that it combines strength and hardness, a fine straight grain, compact structure, and stability. It also takes a fine polish and excels most other hardwoods in its capacity to hold its shape. It is this quality which commends it for electrotpe backing. In Pennsylvania this is its chief use. The car manufacturers give it preference over any other domestic wood for the best grade interior finish of passenger coaches. It is a favorite with the fixture and furniture manufacturers. The qualities, in addition to those mentioned above, are durability, stiffness, density, and ease in splitting. It is somewhat brittle, with a fine, straight grain.

Table 35.—Consumption of Black Cherry, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Printing material,	1,166,800	42.84	\$29 14	\$34,003	634,000	532,800
Brushes,	482,900	17.73	25 43	12,282	482,900	.....
Car construction,	431,414	15.84	60 59	26,140	216,951	214,463
Planing mill products,	177,385	6.51	64 48	11,438	110,085	67,300
Fixtures,	128,700	4.73	66 14	8,512	83,250	45,450
Furniture,	113,900	4.18	34 74	3,957	105,600	8,300
Patterns and flasks,	86,894	3.19	71 58	6,220	54,644	32,250
Boxes and crates, packing,	70,000	2.57	19 00	1,330	70,000	.....
Caskets and coffins,	20,000	.73	60 00	1,200	20,000	.....
Instruments, professional and scientific,	10,000	.37	100 00	1,000	.....	10,000
Handles,	7,500	.28	50 00	375	2,500	5,000
Refrigerators and kitchen cabinets,	7,500	.28	62 50	469	7,500	.....
Weighing apparatus,	7,500	.28	27 90	202	7,500	.....
Instruments, musical,	4,400	.16	75 88	333	3,600	800
Plumbers' woodwork,	4,400	.16	94 55	416	400	4,000
Vehicles and vehicle parts,	2,250	.08	91 56	206	2,000	250
Manual training practice (sloyd),	1,850	.07	55 68	103	1,850	.....
Sporting and athletic goods, ..	100	.....	46 00	5	100	.....
Total,	2,723,493	100.00	\$39 73	\$108,191	1,802,880	920,613

BLACK WALNUT.

(Juglans nigra).

The cut of black walnut in Pennsylvania is equal to three times the total consumed by the factories and five times the quantity of the home grown wood that they report. Black walnut is the most expensive hardwood native to Pennsylvania and was demanded by 17 industries. It is very durable, easy to work, hard, porous, strong, stiff, heavy, stable in place, non-elastic, and with an intermediate straight grain. The makers of caskets and coffins used

the most, followed by the manufacturers of organs and furniture, using nearly equal quantities, and by 14 other industries demanding varying smaller amounts.

Table 36.—Consumption of Black Walnut, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Caskets and coffins,	214,000	27.35	\$59 50	\$12,732	182,000	32,000
Instruments, musical,	131,200	16.77	44 05	5,779	67,700	63,500
Furniture,	130,000	16.61	95 04	12,365	21,000	109,000
Planing mill products,	77,265	9.87	111 31	8,600	52,365	24,900
Car construction,	56,890	7.27	101 13	5,753	980	55,910
Chairs and chair stock,	50,000	6.39	66 08	3,304	44,000	6,000
Fixtures,	35,860	4.58	82 91	2,973	28,860	7,000
Clocks,	21,000	2.68	50 95	1,070	21,000	.....
Patterns and flasks,	14,500	1.85	50 00	725	4,500	10,000
Frames and moldings, picture, ..	10,500	1.34	80 67	847	4,500	6,000
Machinery and apparatus, electrical,	2,500	.32	40 00	100	2,500	.....
Vehicles and vehicle parts,	1,400	.18	91 42	128	1,100	300
Handles,	1,050	.14	81 90	86	1,050	.....
Brushes,	1,000	.13	80 00	80	1,000	.....
Manual training practice (sloyd), ..	850	.11	87 06	77	650	200
Plumbers' woodwork,	300	.04	35 00	10	300	.....
Miscellaneous,	34,200	4.37	71 81	2,456	10,200	24,000
Total,	782,615	100.00	\$72 94	\$57,085	443,705	338,910

SYCAMORE.

(Platanus occidentalis).

Not more than 4½ per cent. of the requirements of the Pennsylvania wood-users was drawn from the State-grown sycamore. This is not surprising, as this species is not an important lumber tree in this State. Sycamore's fine grain revealed by rift sawing and its rich color commend its use for cabinet work. It has a coarse, distinct grain, somewhat contorted, and is hard, heavy, stiff, hard to split, moderately strong and durable, difficult to season and to work, and unstable in holding its shape. Forty-two mills report it, but only in small quantities. Probably the most exacting use of this wood in the country at large is for butcher blocks, but in Pennsylvania none of the manufacturers report using it for that purpose. The chair makers demanded the most that was used, almost 72 per cent. of the total, while the rest was about equally distributed among five other industries, the brush makers being the most important.

Table 37.—Consumption of Sycamore, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Chairs and chair stock,	500,000	71.73	\$25 00	\$12,500	.....	500,000
Brushes,	71,000	10.19	28 00	1,846	.....	71,000
Furniture,	66,170	9.49	43 89	2,904	3,000	63,170
Planing mill products,	28,300	4.06	45 72	1,294	17,000	11,300
Ship and boat building,	20,000	2.87	65 00	1,300	.....	20,000
Boxes and crates, packing,	11,603	1 66	16 00	186	11,603	.....
Total,	697,073	100.00	\$28 73	\$20,030	31,603	665,470

HORNBEAM.

(Ostrya virginiana).

Hornbeam is frequently called ironwood because of its great weight and strength. It has an intermediate grain, is somewhat contorted, is very hard and dense, tough, stiff, durable, and difficult to split, besides being heavy, difficult to season and hard to work, but capable of wearing smooth by use. The wood being heavy, tough, and resilient, is used extensively by the handle makers and the manufacturers of vehicle parts. Its other uses in this State are for mine sprags and for sides of cheese boxes. It is possible that the material reported for the last named use may have been blue beech (*Carpinus caroliniana*), which is also called ironwood and closely resembles hornbeam. Nearly three-fourths of the total amount of the material that is used was supplied by the State, while of that coming from a distance a part was supplied by Canadian forests.

Table 38.—Consumption of Hornbeam, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Handles,	415,500	75.93	\$49 53	\$20,580	315,500	100,000
Vehicles and vehicle parts,	100,000	18.28	30 00	3,000	50,000	50,000
Mine equipment (sprags),	21,684	3.96	13 14	285	21,684	.....
Dairymen's, poultryers', and aplarists' supplies,	10,000	1.83	12 00	120	10,000	.....
Total,	547,184	100.00	\$43 83	\$23,985	397,184	150,000

BLACK LOCUST.

(Robinia pseudacacia=R. Pseudo-Acacia).

All the black locust used by the Pennsylvania manufacturers was grown in the State, and in quantity was equal to more than one-tenth of the total lumber cut of locust in the United States. This was because the wood is demanded for uses which usually require raw material in the forms of billets and bolts, and it is an exception that it leaves the sawmills in the form of planks or boards. Only three industries use this wood in Pennsylvania and two of them cut it into billet form. They are the makers of insulator pins, brackets, and mine sprags. The third industry, vehicle part manufacture, purchases locust in bolt form and uses it for wagon hubs. This species has the distinction of being the most durable native hardwood both in the open when exposed and in contact with the ground, thus accounting for its extensive demand for fence posts. It has a coarse, straight grain, is hard, porous, heavy, and tough, splits easily, holds its shape well, and easily turned.

Table 39.—Consumption of Black Locust, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Insulator pins and brackets,	463,503	91.63	\$23 94	\$11,076	463,500	.....
Mine equipment (sprags),	31,350	6.20	10 18	319	31,350	.....
Vehicles and vehicle parts,	11,000	2.17	18 73	206	11,000	.....
Total,	505,850	100.00	\$22 93	\$11,601	505,850	.....

CUCUMBER.

(Magnolia acuminata).

This tree frequents the mountain slopes and grows to large and symmetrical dimensions. It is a member of the magnolia family, which includes the yellow poplar. It derives its name from the similarity in form and appearance of its fruit cone to the cucumber. The appearance and technical quality of the wood so resemble yellow poplar and the uses of the two are so nearly identical that as a rule they are marketed together without distinction. Owing to this fact it is probable that the manufacturers use more cucumber than the table shows, and it also accounts for Pennsylvania's not being included with West Virginia and Virginia in the production of this kind of lumber. The principal industries using this wood are planing mill products and boxes.

Table 40.—Consumption of Cucumber, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Planing mill products,	267,300	76.07	\$27 00	\$7,217	255,300	42,000
Boxes and crates,	70,000	19.92	17 00	1,190	10,000	70,000
Pulleys and conveyors,	10,000	2.85	18 00	180	.....	.....
Vehicles and vehicle parts,	3,800	1.08	25 00	95	.....	3,800
Agricultural implements,	300	.08	30 00	9	300	.....
Total,	351,400	100.00	\$24 73	\$8,691	285,600	115,800

BUCKEYE.

Buckeye, like cucumber, often loses its identity and goes to market mixed with yellow poplar. It is called for separately by the manufacturers of artificial limbs to meet what may probably be termed its most exacting use, but for this purpose was not reported in Pennsylvania. The wood is light, soft, cross grained, compact, and difficult to split. The color is creamy white and so uniform that the sapwood can hardly be distinguished from the heartwood. Two species of buckeye are native to Pennsylvania, the fetid buckeye (*Aesculus glabra*) and the yellow or sweet buckeye (*Aesculus octandra*). The western part of this State is the eastern limit of both species and it is impossible to ascertain the quantity of each that the manufacturers use. This wood is more evenly distributed among the various classes of manufacture calling for it than any other shown in this report.

Table 41.—Consumption of Buckeye, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Laundry appliances,	125,000	38.56	\$28 00	\$3,500	125,000	.....
Woodenware and novelties,	83,700	25.82	25 00	2,093	.....	83,700
Boxes and crates, packing,	80,500	24.83	22 99	1,851	40,000	40,500
Planing mill products,	35,000	10.79	20 71	725	19,000	16,000
Total,	324,200	100.00	\$25 19	\$8,168	184,000	140,200

APPLEWOOD.

(Pyrus species).

This wood may be of many species and is consumed in larger quantities in Pennsylvania than in any other state in which reports similar to this have been made. It is demanded for a few special purposes, the manufacture of smoking pipes being the most important, while under the heading of printing material, it is used for wood type. As in other states, it is used for making carpenters' tools, particularly handsaw handles.

Table 42.—Consumption of Applewood, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Pipes, smoking,	121,435	70.42	\$52 42	\$6,372	61,435	60,000
Handles,	50,000	29.00	40 00	2,000	25,000	25,000
Handles,	1,000	.58	50 00	50	1,000	.....
Total,	172,435	100.00	\$48 84	\$8,422	87,435	85,000

DOGWOOD.

(Cornus florida).

Nearly all of the dogwood going into final manufacture in Pennsylvania was grown in the State. It is exceedingly hard, strong, of compact structure, and tough, and these qualities together with its ability to wear smooth give it preference over any other wood in the manufacture of shuttles, and commend it for mine sprags. These two industries use 95 per cent. of the total amount reported. Three other industries use the remainder.

Table 43.—Consumption of Dogwood, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Mine equipment (sprags),	139,083	84.74	\$15 73	\$2,188	139,083	.....
Shuttles, spools, and bobbins, ..	17,585	10.71	69 60	1,224	.....	17,585
Instruments, scientific and professional,	7,200	4.39	38 47	277	1,000	6,200
Handles,	230	.14	67 57	16	.....	230
Manual training practice (sloyd), ..	34	.02	90 00	3	34	.....
Total,	164,137	100.00	\$22 59	\$3,708	140,122	24,015

PERSIMMON.

(Diospyros virginiana).

The persimmon tree belongs to the ebony family which is confined largely to tropical regions. The wood has all the good qualities of ash, works more smoothly, and retains a friction polish. Besides it has a very fine, rather straight grain, and is hard, strong, tough, porous, very heavy, and splits easily. Persimmon has two important uses for which there is extensive demand, last-blocks for children's shoes, and shuttles used in textile mills. In the country at large, the greatest quantity probably goes to the latter industry, but in Pennsylvania the makers of boot and shoe findings used all but 12½ per cent. of the quantity consumed.

Table 44.—Consumption of Persimmon, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Boot and shoe findings,	99,000	87.60	\$59 19	\$5,860	.....	99,000
Shuttles, spools and bobbins, ..	7,610	6.20	60 08	421	.....	7,610
Handles,	7,000	6.20	54 00	378	.....	7,000
Total,	113,610	100.00	\$58 92	\$6,659	.....	113,610

BUTTERNUT.

(Juglans cinerea).

Butternut is relatively common on good soil in Pennsylvania. It is used by a greater number of industries in this State than in any other. Nearly 92 per cent. of the total quantity used in Pennsylvania is grown in the State. The most surprising fact in connection with the use of this wood is the consumption of butternut for excelsior at the low price of \$15 per thousand feet. The excelsior makers used more than one-third of all reported, while the fixture manufacturers, the ship builders, and the manufacturers of pulleys were the next in importance, these four industries together consuming 74 per cent. of the total. The rest went to four other industries in varying small amounts. Butternut is often called white walnut. Its qualities include porousness, brittleness, stiffness, lack of resiliency, capacity to split, easy to work, and it is considerably lighter, weaker, and less durable than black walnut.

Table 45.—Consumption of Butternut, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Excelsior,	30,000	34.56	\$15 00	\$450	30,000	.....
Fixtures,	13,500	15.55	44 30	598	13,500	.....
Ship and boat building,	10,000	11.52	80 00	800	7,000	3,000
Pulleys and conveyors,	10,000	11.52	20 00	200	10,000	.....
Planing mill products,	9,600	11.06	30 21	290	6,600	3,000
Patterns and flasks,	5,210	6.00	79 85	416	3,900	1,310
Boxes and crates, packing,	5,000	5.76	16 00	80	5,000	.....
Furniture,	3,500	4.03	26 61	93	3,500	.....
Total,	86,810	100.00	\$33 72	\$2,927	79,500	7,310

MINOR SPECIES.

Domestic woods used in only small amounts, and not of sufficient importance to discuss separately, are as follows: Holly (American), used by the novelty makers, brought in from the southern Mississippi Valley; State-grown aspen (popple), used for excelsior; willow for woodenware, likewise produced in the State; home-grown mountain laurel used by the furniture makers; and sassafras cut in Maryland and purchased by the ship builders.

FOREIGN WOODS.

This term is employed to cover all woods brought into Pennsylvania from foreign countries other than Canada. There are ten of them and Spanish cedar in quantity is the most important.

Only two states have shown so large a consumption of Spanish cedar as Pennsylvania. Nearly 6,000,000 feet is consumed annually and comes principally from the West Indies and Mexico. This tree is not a softwood like the native cedars, nor is it related. It has broad leaves, confining its range to the tropical countries. Its aromatic odor, pleasing color, and lightness, together with the fact that it holds its shape and is easily worked, make it the favorite cigar box wood. Boat builders and furniture makers in Pennsylvania also report this wood in small quantities.

Over 3,500,000 feet of mahogany is brought into the State each year. The furniture makers use the largest amount, although 17 other classes of manufacturers demand it for raw material, and seven of them in quantities exceeding 100,000 feet. The supply of true mahogany comes from Mexico, the West Indies, Central America, and a few states in South America, but it was not possible in any way to ascertain which of these countries supplied the Pennsylvania factories, as mahogany lumber is purchased from American dealers who import the logs and cut them in this country.

Ebony comes next as to quantity among the imported woods and surpasses the consumption of this wood in any other state. The most is used for umbrella handles although the demand for smoking pipe material is also considerable. There are many species of ebony and they are found in various countries. Probably the kind coming from Madagascar and India is used most commonly in this country.

Boxwood comes to this country from Turkey and the West Indies. From the high average price paid for that used in Pennsylvania, it is safe to conclude that most of it was Turkish wood which is much more costly. Boxwood was imported into this State to make shuttles for silk weaving and to furnish material for wood engravings.

Teakwood, strong and very hard, and with a smooth oily texture, is imported from Ceylon, Siam, and India, and in Pennsylvania the entire supply went to two industries, ship building and patterns.

Circassian walnut grows in the mountains in southern Russia near the Black Sea. While very expensive, it is held in high favor in this country for furniture, store, office, and bar fixtures, and cabinet work. It is nearly always used as veneer with a backing or core of an inexpensive native wood.

The olive wood went to the smoking pipe manufacturers. It was brought from France in the form of billets.

Rosewood was the highest priced wood that was purchased in the form of lumber by the Pennsylvania manufacturers. It is a native of Central America and the northern states of South America.

Lignum-vitæ was imported in log or in bolt form from practically the same region as rosewood. It is a wood of special value on account of its extraordinary weight and strength. Bowling balls are turned from this wood after long and careful seasoning.

The eucalyptus used in Pennsylvania comes from Australia and goes to the furniture makers. The eucalyptus grown in the United States is not valued for so many uses as is the imported wood.

Description of Qualities.

Grain: Very coarse, coarse, intermediate, fine, very fine.

Width of sapwood: Very narrow, narrow, medium, wide.

Hardness: Very hard, hard, fairly* hard, soft, very soft.

Density: Dense, fairly dense, slightly porous, porous, very porous.

Weight: Very light, light, medium, moderately* heavy, heavy, very heavy.

Strength: Very strong, strong, moderately strong, weak.

Flexibility and stiffness: Very stiff, stiff, moderately stiff, fairly flexible, flexible, very flexible.

Elasticity: Very elastic, elastic, moderately elastic, non-elastic.

Toughness and Brittleness: Very tough, tough, moderately tough, slightly brittle, brittle, very brittle.

Tendency to Split: Splits easily, splits rather easily, hard to split, very hard to split.

Durability: Very durable, durable, moderately durable, perishable, very perishable.

Stability in Holding Shape: Stable, moderately stable, unstable, very unstable.

Working Quality: Very easy to work, easy to work, fairly hard to work, hard to work.

*Fairly and moderately have the same value in the scale of terms.

PART II.

INDUSTRIES.

The kinds of wood the Pennsylvania manufacturers demand, their botanical relations, their sources, and their qualities, have been discussed in Part I. In Part II are considered the factories using the different woods, and the processes of manufacture that they employ; the extent to which they call for them, and the uses to which they put them according to inherent qualities. For convenience the discussions are divided into classes called industries and those making similar or closely related commodities are grouped together. In Pennsylvania there are 51, and Table 46 following shows how the more than 1,100,000,000 feet of lumber yearly manufactured in the State is apportioned among them. The largest industry requires nearly 280,000,000 feet of raw material, 14 others more than 10,000,000 each, and the smallest less than 100,000. A few other industries which could not be separated because the factories composing them numbered fewer than three, have been grouped in one industry under miscellaneous. To maintain uniformity the same order in classification as has been adopted to other states has been followed in Pennsylvania. Their order has been arranged according to the total quantity used and is as follows:

Table 46.—Summary by Industries of Woods used in Pennsylvania, year ending June, 1912.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Planing mill products,	281,717,600	25.28	\$33 46	\$9,427,936	83,652,088	198,065,512
Boxes and crates, packing, ...	273,901,094	24.58	18 00	4,928,991	51,853,325	222,550,769
Car construction,	228,380,900	20.50	29 53	6,743,700	41,069,552	187,311,348
Furniture,	58,995,170	5.29	35 24	2,078,971	19,045,400	39,949,770
Chairs and chair stock,	33,117,000	2.97	25 80	854,412	14,406,600	18,710,400
Vehicles and vehicle parts, ..	31,801,509	2.85	42 63	1,355,655	13,482,774	18,318,735
Ship and boat building,	26,716,000	2.40	38 44	1,026,722	11,017,200	15,698,800
Caskets and coffins,	13,982,500	1.26	29 77	416,278	4,044,500	9,938,000
Mine equipment,	11,948,897	1.07	19 52	233,283	9,173,653	2,775,244
Fixtures,	11,888,220	1.07	42 25	502,323	3,685,310	8,202,910
Boards—cloth, hosiery, etc., ..	11,775,000	1.06	26 69	314,315	50,000	11,725,000
Patterns and flasks,	11,495,011	1.03	51 39	590,700	2,387,092	8,607,919
Handles,	11,014,907	.99	26 68	293,919	7,425,050	3,589,857
Laundry appliances,	10,795,700	.97	22 17	239,336	6,631,500	4,164,200
Boxes, cigar,	9,980,755	.89	92 77	921,242	24,500	9,906,255
Woodenware and novelties, ...	8,574,780	.77	23 57	202,141	5,328,625	3,246,155
Tanks and silos,	7,853,200	.71	36 07	283,240	150,000	7,703,200
Machine construction,	7,040,350	.63	29 33	206,508	3,558,200	3,182,150
Agricultural implements,	7,004,800	.63	32 89	230,387	2,134,000	4,870,800
Toys,	6,421,500	.58	28 37	182,193	5,004,300	1,417,200
Trunks and valises,	4,122,850	.37	29 72	122,520	1,238,000	2,884,850
Brushes,	4,037,090	.36	22 34	90,189	3,761,700	275,390
Shuttles, spools, and bobbins, ..	3,347,985	.30	27 14	90,888	1,970,000	1,377,985
Dairymen's, poulterers' and apiarists' supplies,	3,240,450	.29	23 82	77,188	1,326,000	1,914,450
Instruments, musical,	2,945,000	.26	30 38	115,982	743,200	2,196,800

Table 46—Concluded.

Industry.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown In Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Machinery and apparatus, electrical,	2,715,200	.24	31 54	85,633	456,100	2,259,100
Pumps,	2,692,000	.24	23 90	64,335	2,075,000	617,000
Baskets and veneer packages for fruit and vegetables,	2,683,000	.24	19 44	52,156	2,408,000	275,000
Frames and moulding, picture,	2,619,000	.24	25 00	65,480	1,040,500	1,578,500
Refrigerators and kitchen cabinets,	2,463,800	.22	30 73	75,720	1,002,250	1,461,550
Excelsior,	1,682,000	.15	14 28	24,016	1,682,000	.....
Equipment, playground,	1,507,300	.14	28 60	43,106	497,800	1,009,500
Printing material,	1,274,326	.11	31 27	39,853	668,000	606,326
Ladders,	1,108,500	.10	29 16	32,321	251,000	857,500
Elevators,	1,008,900	.09	42 08	42,459	245,100	763,800
Whips, canes, and umbrella sticks,	882,880	.08	63 90	56,412	500,100	382,780
Plumbers' woodwork,	584,250	.05	39 43	23,055	145,700	438,550
Insulator pins and brackets, ..	578,500	.05	21 65	12,526	578,500	.....
Butchers' blocks and skewers, ..	520,000	.05	20 77	10,800	520,000	.....
Weighing apparatus,	393,400	.04	31 93	12,561	39,400	354,000
Instruments, professional and scientific,	326,448	.03	57 44	18,750	8,500	317,948
Pulleys and conveyors,	294,500	.03	29 30	8,629	200,500	94,000
Boot and shoe findings,	265,000	.02	56 51	14,975	18,000	247,000
Pipes, tobacco,	227,515	.02	165 49	37,631	61,435	166,080
Sporting and athletic goods, ..	215,150	.02	38 76	8,339	139,100	76,050
Saddles and harness,	188,000	.02	55 32	10,400	136,000	52,000
Gates and fencing,	161,340	.01	22 58	3,643	16,500	144,840
Clocks,	139,500	.01	65 08	9,078	26,000	113,500
Rollers and curtain poles,	125,575	.01	19 77	2,483	115,000	10,575
Manual Training practice (sloyd),	95,945	.01	66 44	6,375	51,875	44,070
Miscellaneous,	7,416,353	.67	26 09	193,466	7,333,703	82,650
Total,	1,114,219,650	100.00	\$29 15	\$32,483,227	313,683,632	800,536,018

In the consumption of wood four classes of factories in Pennsylvania lead all other states: brushes, patterns and flasks, toys, and mine equipment; in seven others the State stood second; car construction, printing material, caskets and coffins, laundry appliances, playground equipment, machine construction, and tobacco pipes. The State was third in box making and the manufacture of wooden clock cases. Excelsior factories, manufacturers of insulator pins and brackets, and the makers of butcher blocks and skewers were the only industries procuring all of their wood from the forests of the State. Nineteen others use a larger amount of State-grown than shipped-in material, leaving 29 that find the major portion of their wood supply out of the State, every industry reported the purchase of some Pennsylvania wood. It is surprising that the box makers, who use only low grades, used more shipped-in material than any other industry, while on the other hand, the handle makers, who usually seek their raw material over a wide extent of territory, procured considerably over two-thirds of their needs within the State.

Nearly \$32,500,000 are annually expended by the Pennsylvania wood users for raw material. Not over 20 per cent. of this is paid for home-grown woods,

leaving not less than \$25,000,000, a large portion of which each year goes to other states. In a great many cases this purchase money could be expended at home, since it is quite evident that the State is not manufacturing as much of its annual cut as is possible. On the succeeding pages the several industries are considered separately in the order of the quantity of wood consumed.

PLANING MILL PRODUCTS.

The extent to which lumber is used in Pennsylvania in the manufacture of building materials is shown statistically in Table 47. This does not, of course, include large quantities of rough lumber used for construction which needs no further change than the hatchet, chisel, and saw to fit it to place on the building. The factories grouped into this industry include four classes. (1) Factories specializing in the manufacture of sash, doors, and blinds or any one of these commodities. Formerly these products were made by small mills operating in nearly every town and city in Pennsylvania doing a general planing mill business but within recent years specialty manufacturing in enormous quantities has demonstrated that these commodities can be manufactured, distributed, and sold cheaper than they can be made at home in small quantities. (2) Factories producing only planing mill products or the more universal commodities kept in stock like flooring, ceiling, siding, stock finish, etc. Planing mills operated in connection with large sawmills are the principal source of these commodities but portable mills having planers and local sash and door factories also produce large quantities. In this class are included mills specializing in the manufacture of hardwood flooring which in Pennsylvania is an important industry, also parquet flooring. (3) There are planing mills and builders' factories engaged in the general planing mill business. This class is the most numerous and widely distributed over the State. They manufacture chiefly according to special design and usually for local consumption. Included in their production are special size sash, doors, blinds, and in small quantities floorings, ceiling, etc., besides material for window and door frames, stair work, cupboards, mantels, panel work, colonnades, grills, and all exterior and interior house finish. A number of factories belonging to this class are formidable industries, especially those located in cities. (4) Industries other than wood-using that maintain a woodworking shop equipped to manufacture various commodities like those mentioned above for their own needs and mainly for the repair and upkeep of their own plant. Steel mills, collieries, railroad companies, textile mills, and various other large manufacturing enterprises are examples.

Over 25 per cent. of the lumber cut of the United States is demanded for manufacturing products belonging to this industry and more wood and a greater number of kinds goes into this line of manufacture than into any other. It is not surprising, therefore, that these same facts apply to Pennsylvania and that in this report the planing mill industry as to quantity leads all others. The table following lists the kinds and amounts of woods used but in no manner does it represent all the lumber required in the State in this line.

Forty-four kinds of wood were reported by the factories grouped under this industry which is the largest number making up any of the forty-eight industries comprising this report. This can probably be explained by the many and varied uses of lumber for building purposes in which operations range as in Pennsylvania from the construction of a rude shanty to expensive palatial residences.

An examination of the list of woods in the table shows that a number of the species used in large amounts do not grow plentifully in the State. The Pacific coast states furnished a considerable quantity, including western white

pine, western yellow pine, redwood, Douglas fir, western red cedar, Sitka spruce, and sugar pine. The region of the southern states contributed large amounts, equivalent to 34 per cent. of all, including more particularly the several species of southern yellow pine lumber and cypress. The Ohio valley, the Lake states, and New England, sent in varying amounts, which explains the comparatively small quantity of home-grown woods used by the planing mills. It must be remembered, however, a large number of these species are not common lumber trees in Pennsylvania.

Only 28 per cent. of the total amount of lumber used was produced in the State. But of the species consumed that are plentifully cut in Pennsylvania, the reports show the demand for a high per cent. of home-grown woods. For instance, over 45 per cent. of the white pine, 67 per cent. of the hemlock, one-third of the chestnut, 80 per cent. of the sugar maple and beech, 60 per cent. of the birch, and half of the basswood reported by the planing mills, were cut from State timber, indicating the importance the forests bear to the development of the State. The planing mill industry is not only the most prominent wood consuming industry in the State but it appeals more widely to the interest of every class of citizens than any other. In order that the supply of lumber the State contributes for building material may be maintained and probably increased in the future, it is necessary to protect and improve the forests as far as possible. With this in view the Commonwealth has put into effect and has in operation a progressive forest policy which if given popular support will help to solve the problem of future lumber supply.

Table 47.—Wood for Planing Mill Products, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
White pine,	62,556,492	22.21	\$36 53	\$2,285,337	29,261,299	33,295,193
Shortleaf pine,	51,870,590	18.41	26 68	1,383,733	.....	51,870,590
Hemlock,	23,077,000	8.19	21 24	490,263	15,349,900	7,727,100
Longleaf pine,	19,612,698	6.96	29 39	576,370	.....	19,612,698
Cypress (bald),	18,790,200	6.67	39 68	745,612	.....	18,790,200
Chestnut,	17,409,350	6.18	37 65	655,450	5,815,700	11,593,650
Yellow poplar,	17,123,372	6.08	37 38	640,042	4,127,990	12,995,382
Red oak,	16,092,048	5.71	41 78	671,551	6,483,450	9,608,598
White oak,	13,714,723	4.87	46 78	641,582	4,325,950	9,388,773
Sugar maple,	9,681,890	3.44	23 75	229,963	8,673,090	1,008,800
Loblolly pine,	7,307,090	2.59	27 52	201,076	.....	7,307,090
Birch,	4,493,442	1.60	39 84	179,033	2,138,844	2,354,598
Western white pine,	2,914,500	1.03	39 55	115,281	.....	2,914,500
Pitch pine,	2,826,000	1.00	22 37	63,206	2,826,000	.....
Basswood,	2,738,576	.97	30 97	84,811	1,396,900	1,341,676
Beech,	2,461,750	.87	16 35	40,250	1,972,250	489,500
Spruce,	1,999,734	.71	29 96	59,904	176,350	1,823,384
Red gum,	1,610,300	.57	31 31	50,422	.....	1,610,300
Sugar pine,	1,122,000	.40	48 20	54,078	.....	1,122,000
Ash,	791,315	.28	51 89	41,062	533,165	258,150
Mahogany,	716,050	.25	159 92	114,512	.....	716,050
Norway pine,	526,000	.19	29 20	15,357	.....	526,000
Cottonwood,	330,000	.12	25 36	8,370	.....	330,000
Western yellow pine,	320,000	.11	34 94	11,180	.....	320,000
Cucumber,	267,300	.10	27 00	7,217	225,300	42,000



Fig. 2.—A collection of finished boxes, made in Pennsylvania.

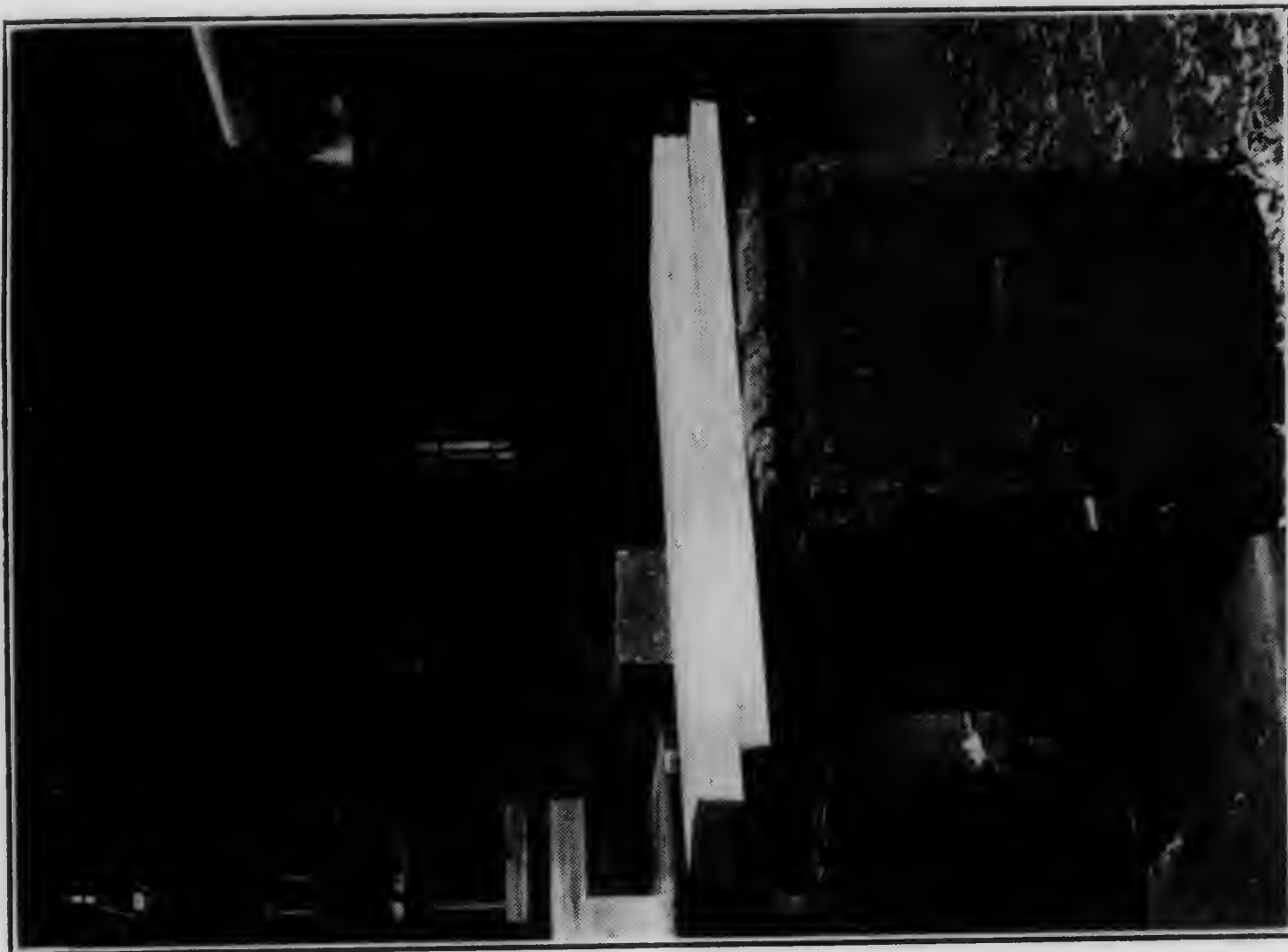


Fig. 4.—Interior of a small Philadelphia box factory. Boxes when nailed are used for city trade.

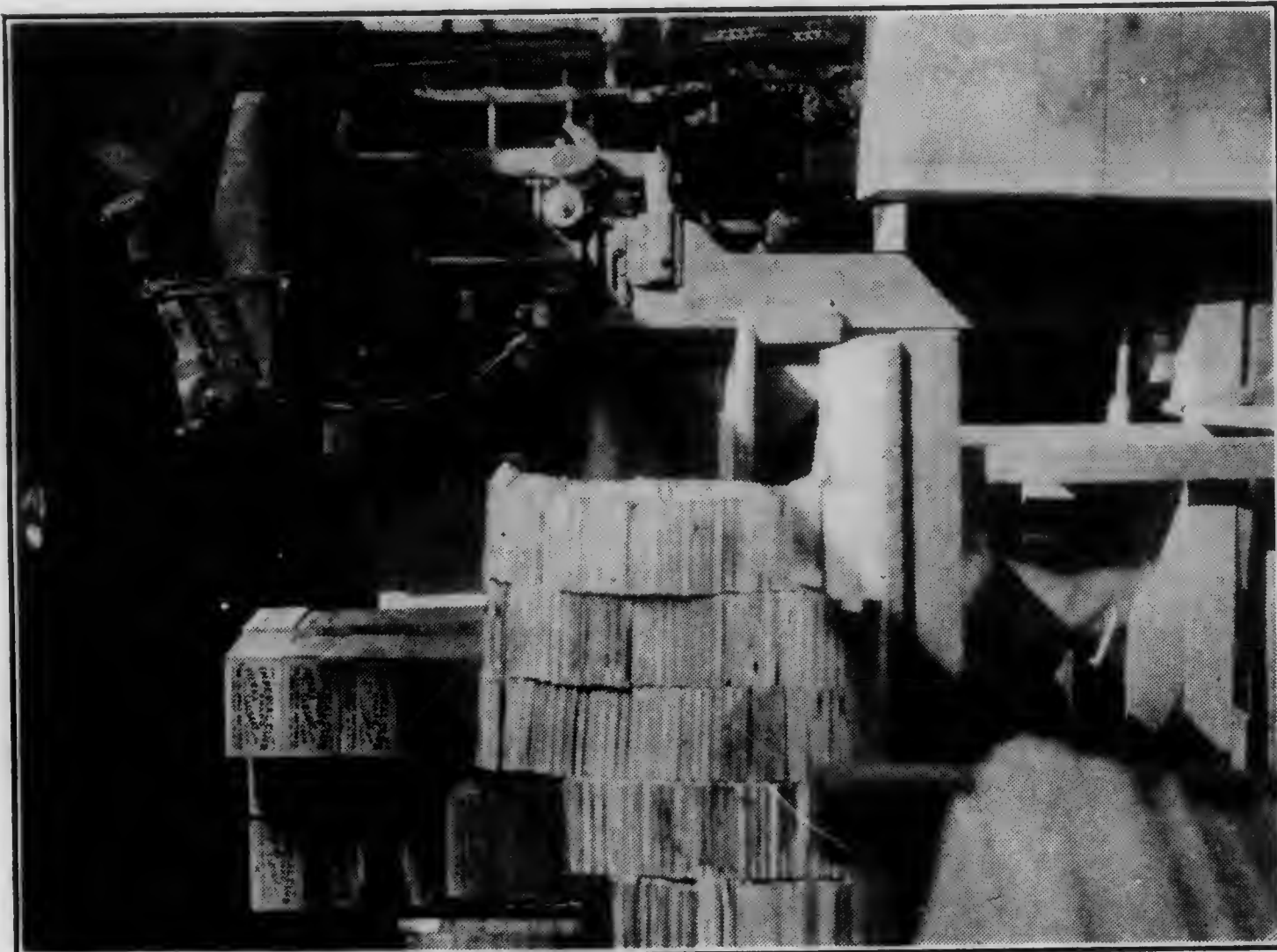


Fig. 3.—Box shooks and nailing machine in a Pennsylvania box factory.

Table 47—Concluded.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Red cedar,	213,000	.08	49 27	10,495	10,000	203,000
Redwood,	197,132	.07	49 19	9,697	.....	197,132
Cherry (black),	177,385	.06	64 48	11,433	110,085	67,300
Cotton gum,	151,648	.05	26 55	4,027	.....	151,648
Douglas fir,	108,500	.04	43 33	4,701	.....	108,500
Hickory,	80,100	.03	27 03	2,165	70,100	10,000
Black walnut,	77,265	.03	111 31	8,600	52,365	24,900
Red and silver maple,	71,750	.03	26 19	1,879	31,750	40,000
Scrub pine,	70,000	.03	20 50	1,435	25,000	45,000
Western red cedar,	55,000	.02	39 09	2,150	.....	55,000
Balsam fir,	40,000	.01	45 50	1,820	.....	40,000
Yellow buckeye,	35,000	.01	20 71	725	19,000	16,000
Tamarack,	30,000	.01	23 00	690	.....	30,000
Sycamore,	28,300	.01	45 72	1,294	17,000	11,300
Sitka spruce,	15,000	.01	35 40	531	.....	15,000
Butternut,	9,600	•	30 21	290	6,600	3,000
White elm,	4,000	•	23 00	92	4,000	.....
Southern white cedar,	1,000	•	120 00	120	.....	1,000
Circassian walnut,	500	•	250 00	125	.....	500
Total,	281,717,600	100.00	\$33 46	\$9,427,936	83,652,068	193,065,512

*Less than 1-100 of 1 per cent.

BOXES.

Next to building material, more wood goes for making boxes and crates in Pennsylvania than for any other use. Over six hundred factories reported the information collated in Table 48. Not more than half of these were regular box manufacturers, as is shown by the list of names in the appendix. There are included glass factories, steel mills, refractories, machinery manufacturers, makers of electrical apparatus, foundries, furniture makers, silk and textile mills, paper factories, large jobbing and department stores, etc., which maintain box departments for making packages and shipping containers to meet their own requirements. The uses of boxes are so numerous in Pennsylvania that it is not practical to attempt to mention or list them. Generally it can be said they are of two kinds, set-up boxes and box shooks. The former includes the nailed, the reinforced, the veneer, the locked corner, and dovetailed, or boxes that are sold ready to use. The nailed box is usually sold in the locality in which it is made. It is rarely shipped put together. The large number of this kind accounted for in Pennsylvania was principally in the large cities where there is an extensive demand or else near to factories and mills using the wooden packages. The reinforced box is a nailed box, the nailed joints and often the body of the box being reinforced with cleats, wire, or steel bands. These are used for shipping ponderous materials where the package is subjected to great strain. Of late this method has also become popular for containers for light materials, including large boxes for millinery, etc., when only very thin resawed material about three-eighths to one-fourth inch is used and the necessary strength supplied by the cleats. Re-shippers belong to this class, most frequently reinforced with steel bands.

They are box crates for carrying back and forth bottled goods and are made of strong material. All that are used in Pennsylvania are not made in the State. Many are shipped in from Maryland, Delaware and Virginia.

The veneer box has recently made remarkable progress. The question of saving in weight and the revenue from the sale of second hand boxes, which lately is being given considerable attention by shippers, has helped the veneer package. The single ply box, wire bound, competes actively with the fiber shipping box but the progress these have made is not so surprising as that of the three ply veneer box. In these the sides, top, and bottom are panels built of three sheets of veneer with the grain transversing and well supported with cleats of thick material. The panels are not only strong and light in weight but the appearance of the single piece sides makes an attractive package. The glue pot enters as an important factor in their manufacture as a good glue joint is the most essential requirement, and, if assured, panel making is simple and makes both for economy and efficiency. Many more of these boxes are shipped into Pennsylvania knocked down than are made in the State. The panel makers are largely in the south where the stands of cheap veneer woods, principally the gums, are easily accessible.

White pine and basswood are the woods for dovetailed and locked corner boxes and large quantities are annually demanded for their making. These are small size containers but probably present the most attractive appearance of any form of wooden packages. They are used for articles of food, powdered substances, jewelry, etc., as the close joints make them more dust and moisture proof. The dovetailed box requires no gluing but the locked corner does. Both kinds are made in Pennsylvania, the latter in the largest quantities. Boxes with the bevel joint corner are not made any more in large quantities. Only a few manufacturers in Pennsylvania reported them.

Shooks are knocked down boxes sold conveniently bundled to facilitate their being assembled and nailed. Different from nailed boxes made and sold in the same region, shooks are manufactured close to the source of the raw material and sent over long distances to consuming centers. A large part of the boxes used in Pennsylvania, but not made there, are brought in in shook form. Shook making includes both shooks for boxes and knock-down crates. Rough lumber of any thickness or kind used to do for crating, and the lumber yard rather than the box factory was the source of the supply. Today the manufacturer shipping his wares in crates desires to express as much character in his package as do those using box containers. In consequence, the shook makers are called on for neat and attractively designed crates and like shooks they are sold with the several parts bundled together, due attention having been given to the size, kind, and thickness of the material in accordance with the weight and character of the goods to be shipped in them.

Another increasing use for crating is the growing tendency to crate articles of steel, iron, and other infrangible metals which heretofore were shipped unboxed. This more especially applies to Pennsylvania than any other state because of the number of industries manufacturing steel and iron products. Massive parts of machinery and electrical apparatus, sheet steel, engines and motors, parts of steel bridges, farm machinery, steam and hot water radiators, stoves and ranges, galvanized iron goods, steel frames for street cars, etc., are examples, and crating is intended more to prevent scarring the finish than to protect from breakage.

As Table 48 shows, the Pennsylvania box makers do not demand a few kinds of wood greatly in excess of others. Nor do they use State-grown woods in preference to lumber that comes from other timbered regions. There were 34 kinds of wood and the total of 11 were shipped in from other states. Of

these the principal were several species of southern pine, and the gums that come chiefly from Virginia and the Carolinas. The total quantity is equivalent to 65 per cent. of the total box material used. White pine, chestnut, hemlock, yellow poplar, and beech were in quantity the principal Pennsylvania woods reported, and cherry, sycamore, and butternut the only kinds reported as entirely home grown. Considering the cut of hemlock in the State, the amount used for boxes and crates was disappointing. But in this particular, this report should prove most useful as with the names and addresses of the box makers and of those using lumber for crating the opportunity is given for increasing the home market for the low grades of lumber cut in the State.

Woods are listed in the table that are rarely used for packing boxes. Their appearance can be accounted for by the fact that they are for novelties which are more or less fancy boxes like sewing cases, for toilet articles, utility boxes, shoe polishing outfits, and those more or less ornamental used in stores for keeping cutlery, jewelry, drugs, etc.

Table 48.—Wood for Packing Boxes and Crates, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Shortleaf pine,	52,719,727	19.25	\$18 00	\$949,003	.....	52,719,727
White pine,	51,583,373	18.83	21 03	1,084,714	19,390,373	32,193,000
Loblolly pine,	36,173,429	13.21	17 51	633,493	.....	36,173,429
Yellow poplar,	18,576,293	6.78	17 44	323,971	4,330,100	14,246,193
Spruce,	14,648,870	5.35	17 42	255,211	975,350	13,673,520
Red gum,	12,806,084	4.68	16 63	213,611	.....	12,806,084
Beech,	12,505,339	4.57	16 17	202,272	3,735,339	8,770,500
Chestnut,	11,977,692	4.37	16 04	192,165	6,275,328	5,702,364
Sugar maple,	11,647,000	4.25	16 43	191,340	3,282,500	8,364,500
Hemlock,	9,269,635	3.39	16 85	156,224	5,365,055	3,904,580
Red oak,	7,224,377	2.64	15 67	113,179	1,801,877	5,422,500
Pitch pine,	6,931,800	2.53	16 32	112,519	979,600	5,952,200
Birch,	5,999,000	2.19	16 76	100,556	2,488,500	3,510,500
Cottonwood,	4,680,000	1.71	24 60	115,135	40,000	4,640,000
Cotton gum,	3,458,722	1.26	14 13	48,873	.....	3,458,722
Black gum,	3,089,800	1.13	15 36	47,463	.....	3,089,800
Basswood,	2,936,400	1.07	16 93	49,708	1,324,400	1,612,000
Scrub pine,	2,251,400	.82	18 93	42,613	30,000	2,221,400
Cypress (bald),	1,719,250	.63	16 62	28,570	.....	1,719,250
Silver and red maple,	1,267,000	.46	12 38	15,685	872,000	395,000
Western hemlock,	500,000	.18	20 00	10,000	.....	500,000
Western yellow pine,	500,000	.18	20 00	10,000	.....	500,000
White oak,	390,500	.14	23 84	9,070	148,000	232,500
Longleaf pine,	241,800	.09	22 04	5,330	.....	241,800
White elm,	229,800	.08	23 50	5,400	82,300	147,500
Cork elm,	200,000	.07	25 00	5,000	50,000	150,000
Norway pine,	90,000	.03	20 00	1,800	.....	90,000
Yellow buckeye,	80,500	.03	22 99	1,851	40,000	40,500
Cherry (black),	70,000	.03	19 00	1,330	70,000	.....
Cucumber,	70,000	.03	17 00	1,190	.....	70,000
Ash,	54,200	.02	23 51	1,274	53,500	700
Sycamore,	11,603	*	16 00	186	11,603	.....
Butternut,	5,000	*	16 00	80	5,000	.....
Red cedar,	5,000	*	35 00	175	2,500	2,500
Total,	273,904,094	100.00	\$18 00	\$4,928,991	51,353,325	222,550,769

*Less than 1-100 of 1 per cent.

CAR CONSTRUCTION.

Formerly all rolling stock except locomotive engines were built of wood but in recent years cars made entirely of metal or of wood with steel under-frame equipment have begun to be substituted both for freight and passenger cars; and in the increasing extent in which they are meeting the demand each year, it is safe to predict that the amount of wood used in this industry will show a rapid decline. In this connection it is interesting to note that the last session of Congress in the interest of public safety had four bills pending requiring replacement of wooden passenger cars with steel equipment on all railroads. This movement is largely in accord with the present policy of the railroads as recent statistics show that approximately 90 per cent. of the passenger cars ordered for future delivery were specified to be of steel construction.

Notwithstanding the increasing substitution of metal for wood in car building, lumber in large amounts is still in demand. In Pennsylvania 228,000,000 feet or more reported for building or repair of cars for 1911 made that industry as to consumption third in the State. The building of cars of all kinds is represented by Table 49. Electric cars for city and interurban transportation is a division of the industry which requires special mention as more wood is used for passenger vehicle equipment in this line than in any other. Vast amounts of lumber are required each year for building mine cars. The number of mining establishments appearing in the directory appended to this report indicates to what extent work of this kind is done by wood-using departments maintained in connection with mining operations. Only one other state exceeds Pennsylvania in the quantity of wood used for car construction. The order of the principal states and the amount consumed is as follows:

Illinois,	407,000,000 feet
Pennsylvania,	228,000,000 feet
New York,	77,000,000 feet
Indiana,	59,000,000 feet
Ohio,	56,000,000 feet
Missouri,	51,000,000 feet
Virginia,	51,000,000 feet

Twenty-nine woods were used by the car builders in Pennsylvania and longleaf pine heads the list, contributing a little over one-third of the total. The superior tensile strength of this wood, its durable properties, and being easy to fit brings it first in demand by the car builder. If all the species of southern yellow pine were combined the amount would represent over one-half the car material reported and taking into consideration the needs of this industry in other states this wood is pre-eminently the principal wood for car construction. Lumber brought from the western states is not used so extensively in Pennsylvania as in other eastern states. Douglas fir and western white pine appear in the table but they were demanded in very limited quantities. The progress made of late in the use of steel underframes for cars of all kinds and especially gondolas and box cars has perhaps affected the use of oak more than any other wood as when these basal parts are made of wood, oak, preferably white and chestnut oak, are the kinds most extensively called for. The great strength of oak and its shock resisting capacity still brings it into wide use for car framing and such purposes, like draft timbers, tie beams, engine beams, platforms, truck parts, etc., and on account of its conspicuous figure, for interior finish of passenger and trolley cars. In this latter capacity it served with ash, birch, yellow poplar, cherry, mahogany, walnut, and red gum. Ash, poplar, and Douglas fir are the woods used in

building the principal parts of locomotive cabs. The floors of the cabs are of sugar maple, the bumpers, pilots, and other parts of the engines are made of white oak.

The annual drain on the forests of the State by the car builders amounts to over 41,000,000 feet. This is less than one-fourth of the total but compared with requirements of other states where the industry is important the quantity of home-grown car material used in Pennsylvania is the largest. Some part of the supply of 20 of the 29 woods were cut in the State. Oak, white pine, hemlock, maple, ash, and beech in the order named as to quantity being the most prominent while the statistics for other woods are as follows:

Table 49.—Wood for Car Construction, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Longleaf pine,	76,932,160	33.69	\$32 21	\$2,477,985	.....	76,932,160
White oak,	50,333,833	22.04	26 63	1,340,166	20,627,572	29,706,261
Shortleaf pine,	32,724,334	14.33	26 10	854,105	.....	32,724,334
Red oak,	31,059,530	13.60	25 35	787,322	9,462,220	21,597,310
White pine,	12,829,420	5.62	31 38	402,637	4,041,869	8,787,551
Loblolly pine,	4,827,625	2.11	25 98	125,422	.....	4,827,625
Ash,	4,396,915	1.92	56 70	249,311	933,908	3,463,007
Yellow poplar,	3,172,113	1.39	57 43	182,175	310,611	2,861,502
Hemlock,	2,006,075	.88	15 53	31,153	1,975,075	31,000
Sugar maple,	1,976,110	.87	18 14	35,856	1,844,660	631,450
Norway pine,	1,518,300	.66	28 97	43,985	25,000	1,493,300
Beech,	1,377,500	.60	17 12	23,583	847,500	530,000
Spruce,	1,367,636	.60	26 35	36,032	189,700	1,177,936
Hickory,	1,115,306	.49	24 50	27,325	343,697	771,609
Pitch pine,	458,600	.20	16 10	7,353	214,800	243,800
Cherry (black),	431,414	.19	60 59	26,140	216,951	214,463
Basswood,	366,010	.16	40 74	14,911	140,214	225,796
Cypress (bald),	352,800	.15	37 93	13,380	.....	352,800
Birch,	312,845	.14	28 86	9,029	231,045	81,800
Mahogany,	230,718	.10	131 88	30,423	.....	230,718
Chestnut,	113,250	.05	21 04	2,383	113,250	.....
Redwood,	100,000	.04	36 00	3,600	.....	100,000
Western white pine,	87,500	.04	54 99	4,812	.....	87,500
Douglas fir,	70,238	.03	45 55	3,199	.....	70,238
Scrub pine,	64,695	.03	23 33	1,509	50,500	14,195
White elm,	63,343	.03	49 43	3,131	.....	63,343
Black walnut,	56,890	.02	101 13	5,753	980	55,910
Red gum,	35,140	.02	27 02	950	.....	35,140
Black gum,	600	*	58 00	35	.....	600
Total,	228,380,900	100.00	\$29 53	\$6,743,700	41,069,552	187,311,348

*Less than 1-100 of 1 per cent.

FURNITURE.

Pennsylvania in the quantity of wood consumed does not compare with a number of other states in the manufacture of furniture, but this industry is one of the oldest in the State and includes in its production the highest grades of furniture and therefore is of considerable economic importance. Furniture can be divided into two general classes: (1) Articles of utility like refrigerators, kitchen cabinets, provision safes, cupboards, etc. These are not a part of the industry here considered, but like chairs have been presented under a separate classification. (2) Commodities where the appearance is as important as durability. In a large number of instances a piece

of furniture is not only pleasing to the eye in its ornamental appointments but from a practical point of view is made of the most suitable material for the purpose. Wood, on account of its natural, attractive grain will be the regular furniture material as long as hardwood timber lasts, and at present there is almost as wide a choice of material in this line as there is lumber available for more common uses. Of the 35 woods listed in Table 50 some part of 22 are wholly or in part decorative woods. Painted or enameled furniture is again coming into favor and in Pennsylvania a considerable quantity of the softer hardwoods was reported for this line of work.

Among the products included in this industry are bedroom furniture, chiffoniers and bureaus, dining tables and buffets, parlor outfits including upholstered furniture, hall appointments, desks, china closets, and book cases. Many of the woods reported went only into parts of furniture not visible, such as coring, frames, brackets, reinforcements, drawer slides, bottoms, and table slides.

Of the exterior woods for the cheaper grades of furniture, solid woods with pronounced grain are most available like red and white oak, ash, chestnut, red gum, butternut, etc. The more expensive work is usually backed with a fairly strong wood adaptable to glue, stable when in place and finished with veneer. This method produces the most pleasing and attractive effects and a permanence rarely to be achieved by the use of solid woods. Indeed it is a rare occasion when the expensive woods such as mahogany, Circassian walnut, rosewood, bird's eye maple, black walnut, etc., are used in solid pieces. Veneer is purchased from the veneer mills according to surface measure, the sheets ranging from 1/24 to 1/4 inch in thickness. The foreign woods are imported in the form of logs and flitches and are cut to veneer by mills in this country. Cores or backing for veneer are made of solid and built-up lumber purchased ready-made with several layers of cheap domestic woods glued with grains transversing. This material has the advantage of being freer from warping tendencies than lumber, besides being lighter, having exceptional strength, and not liable to split. A number of the most particular uses of the several woods shown in the table for furniture have been arranged in the following order:

BEDROOM FURNITURE.

Rails.

White oak.
Red oak.
Circassian walnut.
Mahogany.
Sweet birch.
Sugar maple.
Black walnut.
Sycamore.
Yellow poplar.
Cherry.
Red gum.

Posts.

Black walnut.
Red oak.
Sycamore.
Mahogany.
Sugar maple.
Sweet birch.
Red gum.
White oak.
Circassian walnut.
Cherry.

Panels.

White oak.
Sweet birch.
Black walnut.
Red oak.
Sycamore.
Circassian walnut.
Sugar maple.
Mahogany.
Yellow poplar.
Cherry.
Red gum.

Drawer fronts.

White oak.
Sweet birch.
Black walnut.
Sycamore.
Circassian walnut.
Sugar maple.
Red oak.
Mahogany.
Yellow poplar.
Cherry.
Red gum.

BED ROOM FURNITURE—Concluded.

Drawer sides and ends.

Yellow poplar.
Chestnut.
Beech.
Cherry.
White pine.
Red gum.
Sweet birch.
Basswood.

Drawer bottoms.

Yellow poplar.
Sycamore.
Basswood.
Cotton gum.
Beech.
Red gum.
Cottonwood.

Drawer slides.

Sugar maple.
Hickory.

Mirror frames.

Sycamore.
Sugar maple.
White oak.
Mahogany.
Black walnut.
Circassian walnut.
Yellow poplar.
Cherry.
Red gum.

Backing.

Yellow poplar.
Chestnut.
White pine.
Red gum.
Soft maple.

Bed slats.

Loblolly pine.
Sweet birch.
Sugar maple.
White ash.
Shortleaf pine.

UPHOLSTERED FURNITURE.

Frames (hidden work).

Basswood.
Soft maple.
Longleaf pine.
White oak.
Chestnut.
Shortleaf pine.

Frames (exterior).

Mahogany.
Sweet birch.

White oak.
Red oak.
Black walnut.
Red gum.

Special furniture.

Eucalyptus.
Rosewood.
Red cedar.
Spanish cedar.

BUFFETS, CHINA CLOSETS, CRYSTAL CABINETS, AND SIDEBOARDS.

Tops.

Black walnut.
White oak.
Red oak.
Mahogany.
Sweet birch.

Rails.

White oak.
Red oak.
Black walnut.
Mahogany.
Sweet birch.

Backing.

Chestnut.
Basswood.
Yellow poplar.
Red gum.
Soft maple.
White pine.

Posts.

White oak.
Red oak.
Mahogany.

Sweet birch.
Black walnut.

Doors and door frames.

Black walnut.
Mahogany.
White oak.
Red oak.
Sweet birch.

Bottoms.

Basswood.
White oak.
Red oak.
Sugar maple.

Inlaid work.

Mountain laurel.
Sumach.

Shelves.

Sweet birch.
White pine.
Yellow poplar.

BOOKCASES, DESKS AND MAGAZINE RACKS.

<i>Tops.</i>	<i>Doors and drop lids.</i>
Black walnut.	Sweet birch.
White oak.	Circassian walnut.
Red oak.	Mahogany.
Mahogany.	Black walnut.
Sweet birch.	White oak.
Red gum.	Red oak.
Circassian walnut.	
Yellow poplar.	
<i>Panels.</i>	<i>Backing.</i>
Red gum.	Chestnut.
Red oak.	Basswood.
Mahogany.	Yellow poplar.
Circassian walnut.	Red gum.
Sweet birch.	Soft maple.
White oak.	White pine.
Black walnut.	
<i>Posts.</i>	<i>Bottoms.</i>
Mahogany.	Basswood.
Red oak.	White oak.
White oak.	Red oak.
Black walnut.	Sugar maple.
Red gum.	Yellow poplar.
Sweet birch.	
Circassian walnut.	<i>Shelves.</i>
	Sweet birch.
	White pine.
	Basswood.
	Yellow poplar.

LIBRARY AND DINING ROOM TABLES.

<i>Tops.</i>	<i>Slides.</i>
White oak.	Sugar maple.
Chestnut.	Beech.
Sweet birch.	
Red gum.	
Butternut.	
<i>Legs.</i>	<i>Table leaves.</i>
White oak.	White oak.
Sweet birch.	Red oak.
Red gum.	Mahogany.
Mexican mahogany.	Sweet birch.
Sugar maple.	Butternut.
<i>Pedestals.</i>	<i>Rails.</i>
White oak.	White oak.
Red oak.	Red oak.
Mahogany.	Mahogany.
Sweet birch.	Sweet birch.
Yellow poplar.	Red gum.
	Butternut.

Table 50.—Wood for Furniture, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Red oak,	16,091,700	27.28	\$35 73	\$574,997	2,442,600	13,648,100
Chestnut,	11,556,850	19.59	19 52	225,599	5,586,300	5,970,550
White oak,	10,133,050	17.18	47 30	479,283	2,771,050	7,362,000
Sugar maple,	4,743,900	8.04	26 72	126,632	3,640,100	1,103,800
Basswood,	3,945,400	6.69	35 13	138,592	1,105,400	2,840,000
Yellow poplar,	2,892,000	4.90	36 86	106,593	346,700	2,545,300
Red gum,	2,297,000	3.89	34 25	78,666	.....	2,297,000
Red and silver maple,	1,478,500	2.51	25 49	37,682	730,500	748,000
Beech,	1,453,000	2.46	16 23	23,582	1,397,000	56,000
Mahogany,	1,145,650	1.94	116 42	133,378	.....	1,145,650
Birch,	1,138,270	1.93	29 10	33,126	525,900	612,370
Cottonwood,	380,000	.64	34 87	13,250	.....	380,000
White pine,	298,700	.51	44 32	13,239	281,500	17,200
Cotton gum,	236,500	.40	33 54	7,933	.....	236,500
Red cedar,	178,100	.30	60 81	10,830	.....	178,100
Ash,	175,500	.30	28 43	4,989	82,500	93,000
Shortleaf pine,	141,000	.24	23 92	3,374	.....	141,000
Longleaf pine,	138,500	.23	31 83	4,408	.....	138,500
Black walnut,	130,100	.22	95 04	12,365	21,000	109,100
Cherry (black),	113,900	.19	34 74	3,957	105,600	8,300
Circassian walnut,	92,840	.16	364 08	33,801	.....	92,840
Cypress (bald),	80,500	.14	43 19	3,477	.....	80,500
Sycamore,	66,170	.11	43 89	2,904	3,000	63,170
Loblolly pine,	58,000	.10	22 79	1,322	.....	58,000
Western yellow pine,	10,000	.02	45 00	450	.....	10,000
Rosewood,	5,180	.01	500 00	2,580	.....	5,180
Eucalyptus,	5,000	.01	260 00	1,300	.....	5,000
Butternut,	3,500	.01	26 61	93	3,500	.....
Spanish cedar,	2,500	*	80 00	200	.....	2,500
Southern white cedar,	1,300	*	120 00	156	.....	1,300
Mountain laurel,	1,000	*	40 00	40	1,000	.....
Hickory,	750	*	81 33	61	250	500
Sumach,	500	*	80 00	40	.....	500
Teak,	190	*	200 00	38	.....	190
Satinwood,	120	*	200 00	24	.....	120
Total,	58,995,170	100.00	\$35 24	\$2,078,971	19,045,400	39,949,770

*Less than 1-100 of 1 per cent.

CHAIRS.

Pennsylvania is one of the three leading states in the manufacture of chairs. Over 30,000,000 feet of wood is annually required for their manufacture and of this amount considerably over half is furnished by the forests of the State. The order of the first six states in quantity of wood consumed for chairs is as follows: Wisconsin, North Carolina, Pennsylvania, Massachusetts, New York, and Vermont. It may occur to some that chairs should be grouped with furniture but in Pennsylvania as in other states their manufacture is essentially a distinct industry, generally the form of the raw material is different, the processes of manufacture are in nowise similar, and the products are marketed separately.

Dimension stock is the form of raw material that is utilized in the chair industry perhaps to a greater extent than any other. Sawmills cutting hardwoods and factories using them, principally beech, birch, and maple, often operate as a side line the bolting of low grades and waste into these squares.

Many go as far as to turn the dimensions on lathes after bolting and sell them in that form to chair factories ready to assemble. In the case of the lumbermen, frequently small crooked logs, tops, wind shakes, cut offs, which can be worked for sale in no other way, are thus disposed of. The chair makers, therefore, play an important part not only in lending to the industrial development of the State but also to the movement of conservation in their efforts to encourage utilization or waste. One manufacturer purchases hardwood slabs and edgings from a nearby sawmill and transports this material to his factory for turning handles and chair stock. Another purchases part of the refuse of hardwood stave manufacturers, selects the core and other large pieces, and converts them into chair dowels and rungs.

Chair dimensions include stock of various sizes and kinds for the large number of different designs the chair manufacturers turn out. Table 51 shows the number and kinds of woods that were used in Pennsylvania. Not all chair material is in dimensions by any means. Because seats and backs are altogether cut out of plank ranging from 1½ inches to 2½ inches thick and because the factories are not able to secure enough dimension and turned material to meet their requirements, they are compelled to buy large quantities of plank and rip them up into squares for posts, pillars, spindles, rounds, dowels, etc. The chair stock is always seasoned before used, but those producing squares and turned stock often use unseasoned wood allowing it to air-dry under cover after being manufactured. To prevent loss caution is taken to make allowance for shrinkage and the producer is particular to see to it that the chair stock is straight grained, practically free from defects, and accurately manufactured to conform to specifications.

Perhaps the largest part of the wood used in Pennsylvania is required for turned chairs but quantities are also demanded for straight line designs where the parts are cut considerably wider than they are thick. The demand for these in late years has been on the increase and has led up to the mission patterns in which the stock is still wider and heavier.

Unlike the parts of turned chairs, the manufacturers do not buy their material for the square designs to any extent in the form of dimensions but usually cut them from plank. This is unfortunate because the sawmills have a considerable amount of waste which it is practical to cut into dimension stuff suitable for this line of manufacture. Millmen should note this opportunity and consider negotiations for furnishing this material from waste; and, on the other hand, the economy to the manufacturers should induce the latter to consider the advisability of making overtures to the millmen. Oak, both red and white, ash, and chestnut are the principal woods for chairs of square and mission designs. Other woods like red gum, birch, and elm are used and a figure is stamped on them resembling oak, mahogany, and other woods. That the better grades of chairs are made in Pennsylvania as well as cheaper ones, is evident by the quantity of mahogany brought into the State each year to meet the demand. Birch is most used for imitating mahogany. Woods used for various parts of chairs are as follows:

CHAIRS.

Arms.

Mahogany.
Red gum.
Soft maple.
White oak.

Bent arms.

Elm.

Backs.

Birch.
Elm.
Mahogany.
Red gum.
Red oak.
Soft maple.
White oak.
Yellow poplar.

CHAIRS—Continued.

Camp chairs and stools.

Beech.
Birch.
Sugar maple.

Chair frames, upholstered.

Chestnut.
Red oak.
Soft maple.
Sugar maple.
White oak.

Dowels.

Beech.
Birch.
Soft maple.
Sugar maple.

Fancy chairs.

Mahogany.
Sycamore.
Walnut, black.

Pillars.

Beech.
Birch.
Sugar maple.
White oak.

Posts.

Beech.
Birch.
Mahogany.
Sugar maple.
Red oak.
White ash.
White oak.

Rockers.

Elm.
Sugar maple.
White ash.
White oak.

Rolling chair parts.

Hickory.
Red oak.
Sugar maple.
White oak.

Rounds.

Beech.
Birch.
Hickory.
White oak.
White ash.

Seat frames.

Red oak.

Seats.

Elm.
Mahogany.
Red gum.
Red oak.
Soft maple.
White oak.
Yellow poplar.

Split seats.

Hickory.

Split backs.

Hickory.

Legs.

Beech.
Birch.
Mahogany.
Sugar maple.
Red oak.
White oak.

Mission chairs.

Red oak.
White oak.

Panels.

Mahogany.

Piano stools and benches.

Birch.
Mahogany.
Sugar maple.
White oak.

Spindles.

Beech.
Birch.
Sugar maple.
White ash.

Stretchers.

Beech.
Birch.
Sugar maple.
White ash.

Built-up chair stock, veneer.

Basswood.
Birch.
Chestnut.
Mahogany.
Red gum.
Red oak.
Soft maple.
Sugar maple.
Walnut, Circassian.
White ash.
White oak.

Table 51.—Wood for Chairs, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Beech,	8,420,000	25.43	\$17 21	\$144,945	7,295,000	1,125,000
White elm,	6,213,500	18.76	26 76	166,243	62,000	6,151,500
Sugar maple,	5,348,100	16.15	18 54	99,180	4,746,500	601,600
Red gum,	4,326,000	13.06	25 97	112,328	.....	4,326,000
Red oak,	2,997,200	9.05	33 96	101,785	1,066,500	1,930,700
White oak,	2,228,800	6.73	42 10	93,837	281,800	1,947,000
Birch,	992,400	3.00	30 05	29,824	583,500	408,900
Red and silver maple,	918,500	2.77	28 17	26,876	155,000	763,500
Sycamore,	500,000	1.51	25 00	12,500	.....	500,000
Chestnut,	480,000	1.45	17 71	8,499	95,000	385,000
Mahogany,	461,800	1.39	110 11	50,848	.....	461,800
Ash,	104,300	.32	24 54	2,559	37,300	67,000
Black walnut,	50,000	.15	66 08	3,304	44,000	6,000
Basswood,	33,000	.01	22 12	730	25,000	8,000
Yellow poplar,	24,600	.07	33 05	936	.....	24,600
Hickory,	15,000	.05	17 20	258	75,000	.....
Circassian walnut,	3,800	.01	200 00	760	.....	3,800
Total,	33,117,000	100.00	\$25 80	\$854,412	14,406,600	18,710,400

VEHICLES AND VEHICLE PARTS.

The statistics presented in Table 52 represent the wood used both for motor and horse drawn vehicles. Though there is considerable material used in the manufacture of motor cars including both pleasure cars and commercial trucks, fully 90 per cent. of the material reported went into the latter. The rapid growth of the automobile industry has greatly increased the demand for the vehicle woods, but, according to reports, has not made a corresponding reduction in the demand for horse drawn vehicles. In fact a number of Pennsylvania manufacturers, especially wagon makers, remarked upon the increased production of horse drawn vehicles in the last five years; and those that formerly specialized in building buggies and wagons and now are engaged in making autos have in most cases not relinquished the manufacture of the horse vehicle but have increased their facilities and manufacture both kinds.

Often carriage manufacturers are practically nothing more than assemblers of parts. They buy the wheels and other portions of the running gears and the bodies and tops already manufactured and enter into production only as finishers. In the same way wheelwrights and repair shops that are distributed in nearly every village and town throughout Pennsylvania purchase much of their material like spokes, rims, hubs, hounds, and felloes ready to use. Information was not solicited from these classes of establishments as the scope of the investigation excludes them.

The number of manufacturers making vehicle parts is large in Pennsylvania and the quantity of wood they consumed represents the largest proportion of that shown in the table. Most of this class report making only one commodity as hubs, spokes, rims, poles or shafts. A few, however, specialize in manufacturing two, but in no instance were there reported as many as three.



Fig. 5.—Utilization of mill waste. Rough squares are bolted from slabs and edgings, and turned into chair stock.



Fig. 6.—Chair parts and the squares or dimension stock from which they are made.

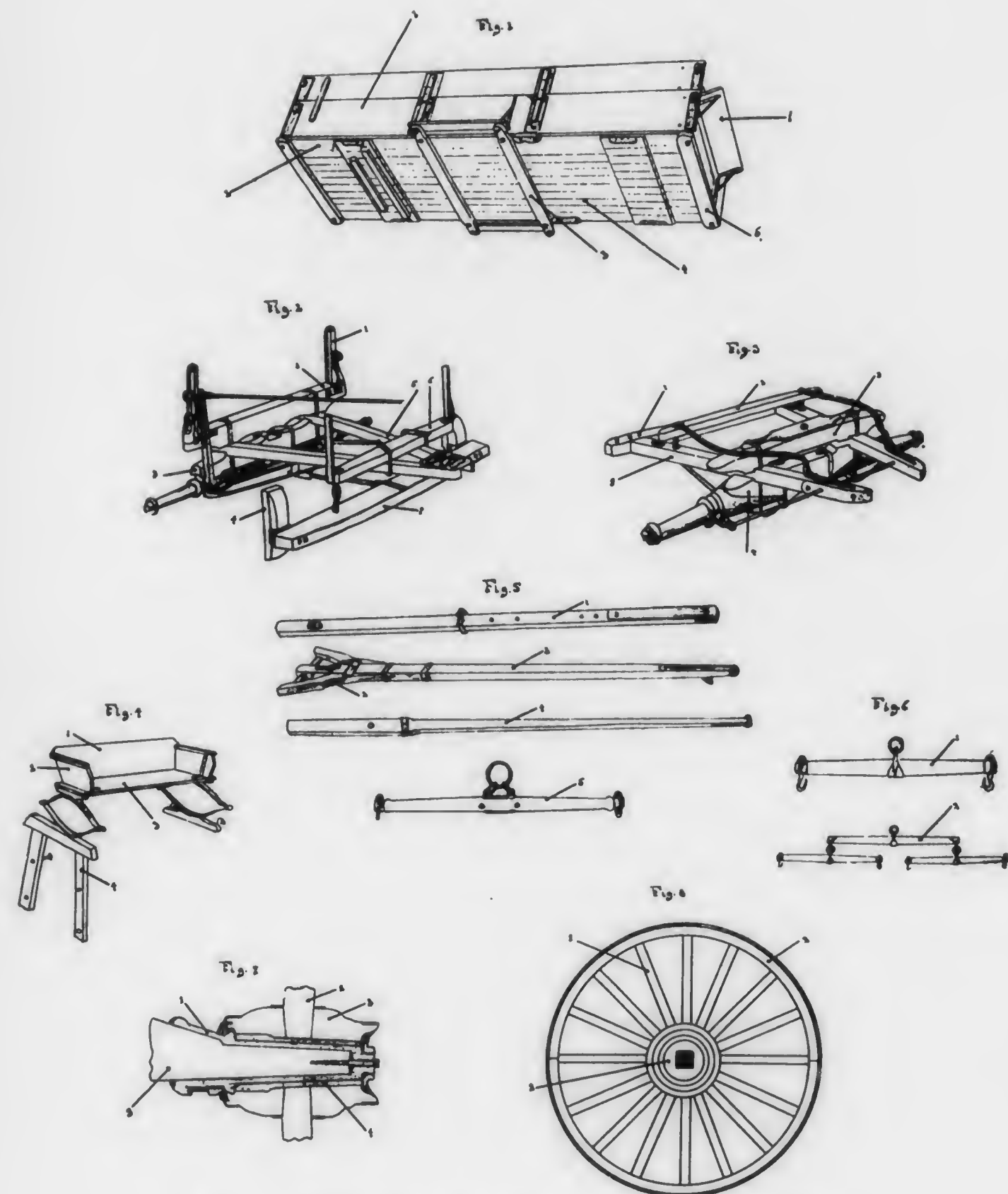


Fig. 7. Parts of a farm wagon, and the woods used.

DESCRIPTION OF FIGURE 7.

FARM WAGON.

Fig. 1. Wagon Body.

1. Wagon box: Longleaf Pine, Yellow Poplar, Cottonwood, Red Gum, White Pine.
2. Sills: White Oak, Red Oak, Sugar Maple, White Ash.
3. Braces: Red Oak, White Oak, Longleaf Pine, Shortleaf Pine, White Ash.
4. Wagon bed: Longleaf Pine, Loblolly Pine, White Oak, Red Oak, Pitch Pine, Spruce, Sugar Maple, White Ash.
5. Cross sill: White Oak, Red Oak, Sugar Maple, White Ash.
6. Foot rest: Longleaf Pine, Shortleaf Pine, Loblolly Pine, White Oak, Red Oak.

1. Riser: White Oak, Red Oak, White Ash, Sugar Maple.

Fig. 5.

1. Reach: White Oak, Red Oak, White Ash, Hickory.
2. Tongue hounds: Hickory, White Oak, White Ash.
3. Drop tongue, { White Oak.
White Ash.
4. Couch tongue, { Hickory.
Longleaf Pine.
5. Neck Yoke: White Oak, White Ash, Red Oak, Hornbeam, Hickory.

Fig. 2. Rear Gear.

1. Stakes, { White Oak.
Red Oak.
2. Bolsters, { Red Oak.
Sugar Maple.
3. Axle bed or axle cap, { Black Birch.
Hickory.
4. Brake block, { Hickory.
Hornbeam.
5. Rear hounds, { White Ash.
6. Hound bar,
7. Brake bar,

Fig. 6.

1. Singletree, { White Oak.
Red Oak.
2. Doubletree, { White Oak.
Hornbeam.
Hickory.

Fig. 3. Front Gear.

1. Yoke, { White Oak.
Red Oak.
2. Hound bar, { Sugar Maple.
Black Birch.
3. Bolster, { Hickory.
Hornbeam.
4. Axle, { White Ash.
5. Front hounds,

Fig. 7. Axle and Hub.

1. Skein.
2. Spoke.
3. Hub.
4. Hub boxing.
5. Axle.

Fig. 8. Wheel.

1. Spoke: White Ash, White Oak, Red Oak, Hickory.
2. Felloe or rim: White Oak, Red Oak, White Ash.
3. Hub: White Oak, Red Oak, White Elm, Rock Elm, Locust, Black Gum, Sugar Maple, Osage Orange.

Fig. 4. Seat.

1. Back board, { White Oak.
Red Oak.
2. Side boards, { White Pine.
Yellow Pine.
3. Bottom boards, { Shortleaf Pine.

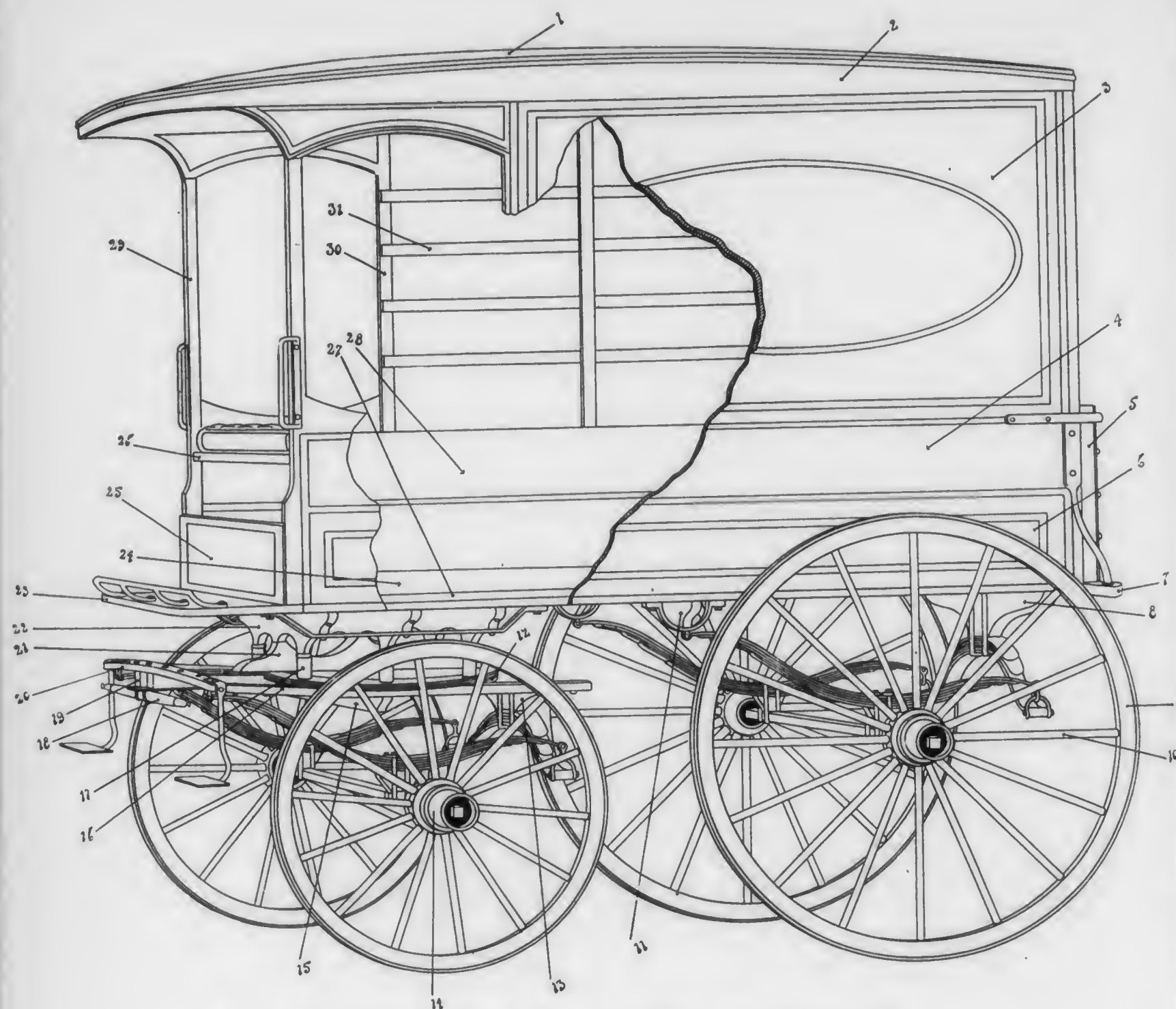


Fig. 8. Showing parts of delivery wagon, and woods used.

PLATFORM DELIVERY WAGON.

- | | |
|--|--|
| 1. Top strips or slats: White Ash, Basswood, White Pine, Yellow Poplar, Sweet Birch. | 18. Singletree: Hickory, White Ash. |
| 2. Top rail: White Ash, White Oak. | 19. Hounds or pole futchels: Hickory, White Ash. |
| 3. Upper panel: Yellow Poplar. | 20. Splinter or drawbar: Hickory, White Ash. |
| 4. Belt or belt panel: White Ash, White Oak. | 21. Upper head block or fifth wheel futchel: Hickory, White Ash. |
| 5. Drop gate: White Ash, White Oak, Red Oak. | 22. Fifth wheel bars or transom bars: Hickory, White Ash. |
| 6. Lower panel or lower side board: White Oak, White Ash. | 23. Footboard or heel board: White Oak, White Ash. |
| 7. Stay bar or rear end crossbar: White Oak, Red Oak, White Ash. | 24. Wagon bed: White Pine, Longleaf Pine, White Ash, Yellow Poplar, White Oak. |
| 8. Hind spring bar or rear spring crossbar: Hickory, White Ash. | 25. Front panel or cross board: Yellow Poplar, White Oak, Red Oak, White Ash. |
| 9. Felloe or rim: Hickory, White Ash. | 26. Seat board: White Pine, White Ash, Longleaf Pine, White Oak. |
| 10. Spoke: Hickory, White Ash. | 27. Sill: White Oak, White Ash. |
| 11. Shackle bar or front spring crossbar: Hickory, White Ash. | 28. Lining: Yellow Poplar, White Pine, Longleaf Pine, Red Oak. |
| 12. Fifth wheel circles: Hickory, White Ash. | 29. Corner posts or pillars: White Oak, White Ash. |
| 13. Spring yoke or spring head block: Hickory, White Ash. | 30. Side pillars: White Oak, White Ash. |
| 14. Hub: Black Gum, Rock Elm, Black Locust. | 31. Side slats or rails: White Oak, White Ash. |
| 15. Lower head block: Hickory, White Ash. | 32. Rear end posts: White Oak, White Ash. |
| 16. Side futchel: Hickory, White Ash. | |
| 17. Fifth wheel spools: Hickory, White Ash. | |

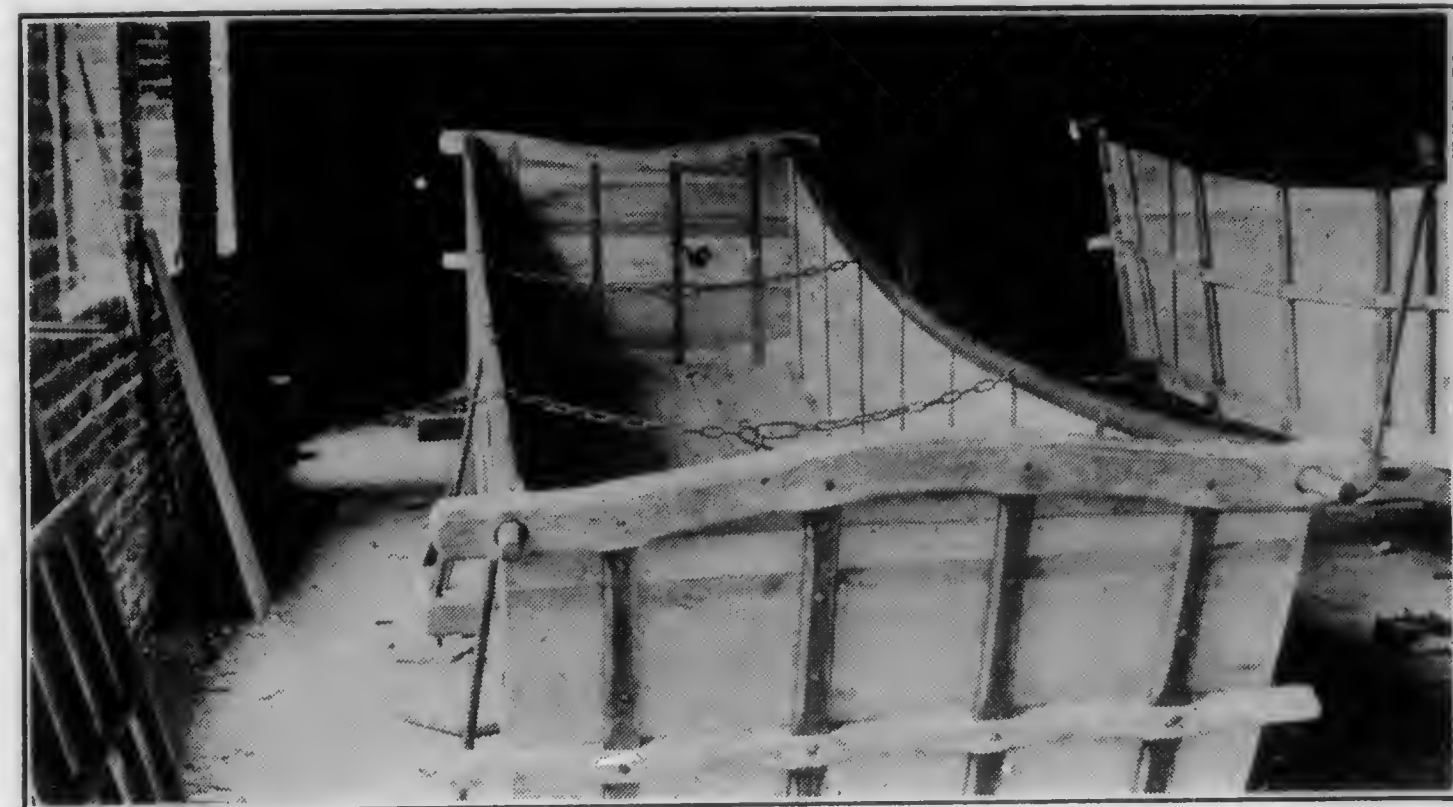


Fig. 9.—Body of an old-time Conestoga wagon. This style of wagon is still being manufactured in Pennsylvania.



Fig. 10.—Hickory, oak and pine waste of a large Pennsylvania wagon manufacturer being sold for fuel. Much of this is suitable for small commodities made from this wood.



Fig. 11.—Manufacture of limousine bodies. Panel work of yellow poplar.

Thirty-two kinds of wood are used by the vehicle industry. That so many kinds are required is surprising, but this can probably be accounted for by the search being made for substitutes which has brought species heretofore little used into this industry for experimentation. For instance, elm was formerly the chief hub wood, but now birch has proved practical and large quantities are consumed by the hub makers. Yellow locust and black gum are also extensively used. Hickory was the principal spoke wood but now vast amounts of white and red oak are demanded; while yellow poplar does better than any other wood for bodies, large quantities of cottonwood and red gum are taking its place and some manufacturers prefer these because they do not split so easily and are susceptible of taking a higher polish. White ash is chiefly used at the present time for vehicle bows but it is not so well adapted to this use as hickory, white oak, or cork elm.

Hickory is the premier wood in vehicle making and white oak the next. The use of both of these is confined mainly to the production of gear parts. In the manufacture of heavy wagons, which is one of the most important divisions of this industry in Pennsylvania, white oak and red oak, the latter to a much less extent, are in the greatest demand. Yellow poplar, which comes third in the list, indicates the high grades of vehicle made in the State, as only the high priced carriages, delivery wagons, and automobiles can afford this wood on account of its cost. In the manufacture of automobile bodies and to a small extent for horse drawn vehicles metal has proved a formidable competitor of wood, but the fact that it is used for cheaper grades indicates that the use of wood gives better results. Next to yellow poplar, ash entered into body construction more than any other wood and in some states in which studies similar to this have been made the quantity used in this line exceeds that of yellow poplar. In Pennsylvania ash stands fourth. All of the rich cabinet woods reported were employed by the automobile body makers.

Table 52.—Wood for Vehicles and Vehicle Parts, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Hickory,	10,819,552	34.02	\$48 51	\$524,895	3,642,252	7,177,300
White oak,	10,819,552	34.02	\$48 51	\$524,895	4,378,300	2,509,667
Yellow poplar,	3,764,335	11.84	50.49	190,055	755,285	3,009,050
Ash,	3,590,472	11.29	44 16	158,564	2,096,204	1,494,268
Basswood,	1,514,500	4.76	48 11	72,864	455,000	1,059,500
Red oak,	994,900	3.13	28 43	28,285	589,800	405,100
Sugar maple,	625,800	1.97	28 67	17,940	314,200	311,600
Beech,	587,883	1.85	21 97	12,916	537,883	50,000
Longleaf pine,	576,550	1.81	34 33	19,791	.....	576,550
Basswood,	477,850	1.50	30 10	14,384	258,500	219,350
Shortleaf pine,	467,200	1.47	26 67	12,461	.....	467,200
Cork elm,	390,900	1.23	36 30	14,190	25,300	365,600
Red gum,	315,500	.99	32 37	10,212	500	315,000
Black gum,	181,800	.57	37 57	6,831	31,500	150,300
White pine,	140,550	.44	34 62	4,866	118,050	22,500

Table 52—Continued.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Hornbeam,	100,000	.32	30 00	3,000	50,000	50,000
White elm,	93,500	.29	34 31	3,208	70,500	23,000
Cottonwood,	64,000	.20	34 38	2,200	24,000	40,000
Pitch pine,	55,200	.17	22 77	1,257	55,200	.....
Silver maple,	47,000	.15	26 13	1,228	47,000	.....
Loblolly pine,	41,900	.13	28 07	1,176	.....	41,900
Chestnut,	30,200	.10	19 77	597	18,200	12,000
Mahogany,	14,900	.05	159 13	2,371	.....	14,900
Locust (black),	11,000	.04	18 73	206	11,000	.....
Spruce,	8,000	.03	48 88	391	1,000	7,000
Cucumber,	3,800	.01	25 00	95	.....	3,800
Cherry (black),	2,250	.01	91 56	206	2,000	250
Walnut (black),	1,400	.....	91 42	128	1,100	300
Cypress (bald),	1,000	.....	50 00	50	.....	1,000
Walnut (Circassian),	500	.....	350 00	175	.....	500
Rosewood,	100	.....	260 00	26	.....	100
Total,	31,801,509	100.00	\$42 63	\$1,355,655	13,482,774	18,318,735

SHIPS AND BOATS.

The Delaware River's close and direct connection with the Atlantic Ocean as far up as Philadelphia affords sufficient depth and natural advantages to make that city one of the principal harbors of the Atlantic coast. All kinds of seafaring vessels land at its ports, including men-of-war and ocean liners, and railroads have located their terminal docks along its banks on the Pennsylvania side providing conveniences for the loading of coal, grain, and other commodities for export. In the western part of the State the Ohio River and its navigable tributaries afford excellent advantages for river navigation and accordingly the transportation of coal, sand, ore, lumber, steel, and other heavy freight for short hauls has become an important industry. Flat bottom boats are the kind used, such as packets, river tugs, barges, scows, flats, etc. A number of rivers in Pennsylvania, navigable only for small crafts, traverse parts widely known for their picturesque scenery. These are rarely used in commerce, but are inviting to the pleasure seekers for sailing, rowing, and canoeing. It is evident that in order to meet the local demand, the industry of ship and boat building in Pennsylvania must necessarily be varied. Crafts of all kinds are built in the State, from dreadnaughts and ocean steamers down to the shell used by the professional oarsmen.

In building large vessels, steel construction has, to a large extent, taken the place of wood. Probably in no other industry has substitution been carried so far as in shipbuilding. It has been less than a century when wood for this kind of boat was the most important and valuable material used, and though still required, its use is only incidental and answers principally for decking, interior finish, furniture, masts, spars and booms, armor backing, templates, joinery work, etc. Smaller boats like steamers for inland water transportation, ferry boats, tugs, etc., use wood more extensively. Their hulls are of metal but their superstructure is mainly of wood while river crafts,

scows, and barges are entirely of wood, and the same is true of small sail boats, canoes, launches, and other pleasure craft.

This industry not only supplies a large part of the local demand but boats built in Pennsylvania are sold world wide. Other states have more extensive harbor facilities, water fronts, and inland waterways than Pennsylvania, but are not comparable in the size and importance of their shipbuilding industry. In fact only one state surpasses Pennsylvania in the quantity of lumber consumed for boat building. New York in 1912 used 37,700,500 feet while other states in order for quantity are as follows:

Pennsylvania,	27,635,000
New Jersey,	13,341,000
Virginia,	11,138,000
Delaware,	7,679,000
Connecticut,	7,084,354

The uses of wood in boat building are multitudinous. In an ordinary schooner made of wood there are 500 different parts separately named. A large number of them require lumber with special qualities, which probably accounts for the long list of woods shown in Table 53. It is impossible to undertake to specify here the different woods for all parts of the many kinds of boats produced in the State but a few of the principal uses of lumber were mentioned by the boat builders and from their reports the following list has been arranged:

SHIPS, YACHTS, AND RIVER CRAFT.

Frames.

White oak.
Red oak.
Hemlock.

Keels.

White pine.
White oak.
Cypress.
Hemlock.
Red oak.

Knees.

White oak.
White ash.
Sassafras.
Tamarack.

Paddle Wheels.

White oak.
Yellow poplar.

Stern Posts.

White oak.
Tamarack.

Rudders.

White oak.
White pine.
Cypress.

Planking.

Cypress.
White pine.
Shortleaf pine.
Douglas fir.
Spruce.

Decking.

Cypress.
White pine.
Hemlock.
Douglas fir.

Rails.

Teakwood.
Mahogany.
White ash.
White oak.
Longleaf pine.
Hickory.

Masts.

Spruce.
Hemlock.
Douglas fir.

Booms.

Spruce.
Hemlock.
Douglas fir.
Shortleaf pine.
Longleaf pine.

Cabins (Interior).

Chestnut.
Mahogany.
Teakwood.
White ash.
Sweet birch.
Sycamore.
Cypress.
*Black walnut.
*Circassian walnut.
Butternut.

SHIPS, YACHTS, AND RIVER CRAFT—Concluded.

Cabins (Exterior).

White pine.
Yellow poplar.
Hemlock.
Douglas fir.
Cypress.
Longleaf pine.

Spars.

Spruce.
Hemlock.
Douglas fir.

CANAL BOATS.

Cabins.

White pine.
Yellow poplar.
Hemlock.
Longleaf pine.

Keels.

White pine.
White oak.
Cypress.
Douglas fir.
Red oak.

Frames.

White oak.
Red oak.
Hemlock.

Knees.

White oak.
White ash.
Red oak.

Decking.

Longleaf pine.
Hemlock.

Planking.

Hemlock.
Longleaf pine.
Douglas fir.

Stern Posts.

White oak.

BARGES, SCOWS, AND FLATS.

Frames.

White oak.
Red oak.
Longleaf pine.

Douglas fir.
Red oak.

Bottom Boards.

White pine.
Spruce.

Planking.

White pine.
Spruce.
Douglas fir.
Red oak.

MOTOR BOATS.

Stems.

White oak.
White ash.

Deck Beams.

White oak.
Red oak.

Keels.

White oak.
White ash.

Ribs.

White oak.
Red oak.
White ash.

Stern Posts.

White oak.
White ash.

Coaming.

White ash.
White oak.

Decking.

Mahogany.
White cedar.
Spanish cedar.
Cypress.
White oak.

Planking.

Cypress.
White cedar.

*Not reported.

CANOES AND SKIFFS.

Gunwales.

Spruce.
Mahogany.

Ribs.

White cedar.
Spanish cedar.
White ash.

Paddles.

Spruce.
Sugar maple.

Decks.

White ash.
Sweet birch.
Sugar maple.
Mahogany.

Planking.

White cedar.
Spruce.
Spanish cedar.

ROW BOATS.

Bottom Boards.

Shortleaf pine.
Douglas fir.
Spruce.
White pine.
Cypress.

Stern Posts.

White oak.
Red oak.
Longleaf pine.

Sides.

White pine.
Douglas fir.
Hemlock.
Spruce.

Transoms.

Shortleaf pine.
Spruce.
Hemlock.
White pine.

Oars.

Spruce.
White ash.

Seats.

White pine.
Longleaf pine.
Shortleaf pine.
Hemlock.

Longleaf pine is the principal species for shipbuilding. It is listed ahead of all other woods, not only in Pennsylvania but in all the important boat building states. Douglas fir is brought from the Pacific coast states especially for parts, as is seen above, requiring timbers of large dimensions and long lengths. It is easily worked, holds its shape, and, similar to longleaf pine, possesses great tensile strength and elasticity. The Pennsylvania ship builders demand more of this wood than is shown by the same industry in any other state. The same is true of hemlock and this is quite significant in that it serves principally for bottoms, planking, and other parts of river crafts for which white pine heretofore has been most extensively used. White pine still meets a portion of the ship builders' demands, irrespective of its growing price. Of the total amount used, 65 per cent. was reported as home grown. Mahogany, teak and Spanish cedar were the only foreign woods reported.

Table 53.—Wood for Ship and Boat Building, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Longleaf pine,	5,286,000	19.79	\$37 56	\$198,520	.....	5,286,000
White pine,	4,544,650	17.01	46 85	212,928	2,733,150	1,811,500
Hemlock,	4,343,000	16.26	25 92	112,551	4,217,000	126,000
White oak,	3,871,400	14.49	34 73	134,436	2,230,900	1,640,500
Douglas fir,	2,521,000	9.44	42 41	106,926	.....	2,521,000
Red oak,	2,434,000	9.11	35 24	85,770	1,180,000	1,254,000
Southern white cedar,	1,081,000	4.05	56 40	60,970	.....	1,081,000
Spruce,	1,013,000	3.79	31 06	31,464	200,000	813,000
Shortleaf pine,	480,800	1.80	28 74	13,820	.....	480,800
Ash,	388,700	1.45	41 47	16,118	262,700	126,000
Cypress (bald),	287,000	1.07	55 64	15,970	.....	287,000
Basswood,	150,000	.56	16 00	2,400	150,000	.....
Yellow poplar,	84,000	.31	58 07	4,878	2,500	81,500
Teak,	64,000	.24	190 66	12,202	.....	64,000
Mahogany,	57,000	.21	164 39	9,370	.....	57,000
Hickory,	28,000	.10	65 00	1,820	26,500	1,500
Sycamore,	20,000	.08	65 00	1,300	.....	20,000
Redwood,	20,000	.08	52 30	1,046	.....	20,000
Tamarack,	10,300	.04	45 73	471	300	10,000
Spanish cedar,	10,000	.04	250 00	2,500	.....	10,000
Butternut,	10,000	.04	80 00	800	7,000	3,000
Sugar maple,	3,500	.01	29 14	102	2,500	1,000
Chestnut,	3,100	.01	27 10	84	3,100	.....
Black gum,	3,000	.01	70 00	210	.....	3,000
Beech,	2,500	.01	26 00	65	1,500	1,000
Sassafras,	50	*	25 00	1	50	.....
Total,	26,716,000	100.00	\$38 44	\$1,026,722	11,017,200	15,698,800

*Less than 1-100 of 1 per cent.

CASKETS AND COFFINS.

This industry includes, in addition to caskets and coffins, outer or rough boxes and shipping cases. Caskets are the burial cases more universally used. Coffins, at one time in greater demand, are now but relatively seldom employed. They are irregular in form, widest at the part corresponding to the shoulders, narrowing slightly towards the head, and considerably at the feet. The statistics for Pennsylvania show not over 5 per cent. of the wood demanded by the manufacturers was for coffins. More than this amount is used, however, since many coffins are handmade. They are manufactured by cabinetmakers who cater for local trade in all small towns throughout the State. The quantity of wood used by one is small, but for a thickly populated state like Pennsylvania the aggregate consumption would amount to considerable, although it was found impracticable to collect statistics so widely scattered. Black walnut for many years has been the principal coffin wood and it is still called on for the better grades. Cheap coffins are of woods that are soft, easily worked, and at the same time adaptable to stain and polish. Yellow poplar is more used than any other kind for both factory and hand made coffins. In the southern states cypress is the leading coffin material, on the Pacific coast western red cedar, and in the Lake states basswood.

Twelve woods were reported by casket makers. They range from high priced mahogany down to low grades of chestnut and white pine. These burial cases are varied in design, some have an octagonal appearance—the corners instead of being rectangular are cut off and squared. Some have rounded corners, and others are uniformly rectangular. Nearly all are cloth covered and though this permits the use of the lower grades, the lumber selected is free from the defects which would likely affect the strength and durability of the casket. Chestnut is the most used casket wood in all states because it has proved especially durable under ground, and it possesses the combined qualities of lightness and strength, cheapness, and an affinity for glue that holds the cloth. Some of the chestnut used in casket manufacture is of the best, but the largest part is the "sound wormy" grade. As far as durability is concerned this grade is sufficient and the fact that it is perforated with the small worm holes averaging the size of a pin head is an advantage rather than a detriment, as in covering the casket these holes afford an additional hold for the glue. Other woods generally competing as casket material are yellow poplar, red oak, white cedar, cypress, red cedar, white pine, walnut, red gum, white oak, sugar maple, and mahogany. All of them go for cloth covered caskets and some answer for burial cases finished with natural appearance where the wood selected has a handsome grain and is susceptible to the highest polish, similar to that on piano cases. High priced caskets are of this kind and in addition the most expensive are richly carved. The Pennsylvania manufacturers use quartered red oak and white oak, mahogany, and walnut for making these and also to a limited extent red gum, which, from the price paid, must have been selected to imitate Circassian walnut.

The lumber used for outer cases, sometimes called rough boxes, and for shipping cases to protect the coffin or casket in transit, is made of similar woods, but the latter are more carefully manufactured, stronger and neater in appearance. At their destination they serve as rough boxes to receive the casket when put into the ground. White pine in Pennsylvania meets most of the demand and yellow poplar next. Other species reported were western white pine, red cedar, hemlock, chestnut, red oak, and mahogany.

Table 54.—Wood for Caskets and Coffins, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Chestnut,	5,387,000	38.53	\$20 57	\$110,807	1,573,500	3,813,500
White pine,	4,793,000	34.28	28 90	138,495	703,500	4,089,500
Hemlock,	1,000,000	7.15	28 00	28,000	1,000,000	.....
Yellow poplar,	748,000	5.35	32 10	24,068	432,000	316,000
Red oak,	665,000	4.76	40 44	26,890	55,000	610,000
White oak,	523,500	3.74	62 20	32,562	77,500	446,000
Mahogany,	331,000	2.37	76 30	25,255	.....	331,000
Black walnut,	214,000	1.53	59 50	12,732	182,000	32,000
Red cedar,	169,000	1.21	66 72	11,275	.....	169,000
Sugar maple,	35,000	.25	25 00	875	.....	35,000

Table 54—Concluded.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Red gum,	30,000	.22	40 00	1,200	.....	30,000
Western white pine,	20,000	.14	42 50	850	.....	20,000
Redwood,	20,000	.14	54 00	1,080	.....	20,000
Cherry (black),	20,000	.14	60 00	1,200	20,000	.....
Cypress (bald),	20,000	.14	40 00	800	.....	20,000
Longleaf pine,	6,000	.04	37 50	225	.....	6,000
Birch,	1,000	.01	24 00	24	1,000	.....
Total,	13,982,500	100.00	\$29 77	\$416,278	4,044,500	9,938,000

MINE EQUIPMENT.

In conjunction with the operation of coal mining, there is usually maintained a wood-working department for the manufacture and repair of all wooden equipment required in connection with the work. Table 55 includes all the kinds of material used for these various purposes except that used in the rough, as props, lagging, caps, segments, sills, etc. In the interior of the mines lumber goes for uses in connection with ventilation schemes; brattices, doors, airways, manways, and for pit railing, etc. On the breakers in collieries it is used for tippie parts, drum bands, chutes, screens, scraper lines, flights, etc., besides it answers for parts of haulage systems, slope rollers for example, and for sprags and various other less important commodities. The lumber used for mine cars and their repair has been included as shown above, under car construction, while that going into manufactured parts for houses, buildings, and other building operations was listed with similar material under the planing mill industry. The available statistics reported by both anthracite and bituminous operations in Pennsylvania are as follows:

Table 55.—Wood for Mine Equipment, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Hemlock,	2,260,750	18.92	\$20 82	\$47,066	2,260,750	.....
White oak,	2,019,927	16.91	18 22	36,805	2,019,927	.....
Black gum,	1,628,460	13.63	24 37	39,678	219,216	1,409,244
Hickory,	816,363	6.83	13 51	11,031	816,363	.....
Red oak,	807,845	6.76	14 73	11,892	807,845	.....

Table 55—Concluded.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Sugar maple,	790,200	6.61	18 67	14,751	790,200	.....
Chestnut,	749,405	6.27	15 42	11,557	749,405	.....
Beech,	656,525	5.50	17 49	11,781	656,525	.....
Shortleaf pine,	567,000	4.75	21 14	11,983	.....	567,000
Longleaf pine,	423,000	3.54	26 39	11,163	.....	423,000
Birch,	336,075	2.81	24 23	8,143	336,075	.....
Pitch pine,	246,000	2.06	23 07	5,675	246,000	.....
White pine,	239,000	2.00	23 70	5,665	13,000	226,000
Red gum,	150,000	1.26	12 00	1,800	.....	150,000
Dogwood,	139,088	1.16	15 73	2,188	139,088	.....
Ash,	43,425	.36	22 01	956	43,425	.....
Locust,	31,350	.26	10 18	319	31,350	.....
Hornbeam,	21,684	.18	13 14	285	21,684	.....
Yellow poplar,	14,000	.12	22 50	315	14,000	.....
Cork elm,	8,800	.07	26 14	230	8,800	.....
Total,	11,948,897	100.00	\$19 52	\$233,283	9,173,653	2,775,244

Two commodities included in the above table deserve special mention and to show the kinds of wood used in making them, separate statistics have been arranged and are presented in the supplemental tables, 55a, mine rollers, and 55b, sprags.

MINE ROLLERS.

Table 55a shows seven woods going into slope rollers. They aggregate nearly 2,500,000 feet of material used annually, but this does not represent wood for rollers that are manufactured elsewhere and brought to the State ready for use. Slope mining in recent years is being superseded by the shaft method and with the change is a corresponding decline in the demand for rollers or pulleys used on the slope to prevent abrasion of the cable against the ground. Two-thirds of the roller material is black gum. That obtained from timber cut in the State is mostly the species, *Nyssa sylvatica*, but that coming from a distance, usually in the form of bolts, is a mixture of the above named species with water gum (*Nyssa biflora*), and a small amount probably of tupelo (*Nyssa aquatica*). Black gum is frequently the common name for all three. The first two species are the most desirable for rollers because of their interlaced fiber that will not splinter nor roughen but wears smooth to a polish by use. Further than this, the woods possess the superior qualities of hardness and toughness, and on account of their abundance, especially in the southern states, are the lowest priced hardwoods. Maple is especially adapted for slope rollers, but owing to its growing scarcity and high price black gum has largely superseded it. Formerly maple was the most used wood for the purpose, but the table shows that the demand for it at present is only one-sixth of that of black gum.

Veneer cores, the symmetrically round pieces left after the veneer has been removed by the rotary cut process, are now being used for making mine rollers, when the species is one of the black gums. These cores are an off-

fall that represents to a large degree a complete waste and the fact that they are suitable for this line of manufacture should certainly be a means of utilizing a large quantity of this discarded material.

Table 55a.—Wood for Mine Rollers, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Black gum,	1,623,960	66.54	\$24 33	\$39,588	219,216	1,404,744
Sugar maple,	277,200	11.36	26 99	7,482	277,200	.....
White oak,	212,080	8.69	30 57	6,483	212,080	.....
Birch,	153,200	7.51	30 70	5,624	153,200	.....
Beech,	123,200	5.05	30 84	3,799	123,200	.....
Yellow poplar,	12,000	.49	18 75	225	12,000	.....
Cork elm,	8,800	.36	26 14	230	8,800	.....
Total,	2,440,440	100.00	\$25 99	\$63,431	1,035,696	1,404,744

SPRAGS.

This is a second division of this industry which deserves special attention, not that it represents a commodity that is important in the amount of wood consumed nor economically prominent in the operation of large factories and the use of skilled labor, but because it serves to illustrate the tendency in Pennsylvania towards waste utilization.

A sprag is a cylindrical wooden commodity pointed at each end, about 21 inches long, ranging in thickness from 2½ to 3½ inches and is used in coal mining operations for checking and regulating the speed of a mine car as it runs in and out of the laterals leading to the shafts. The speed of the car is checked by locking one of its wheels. This occurs when the sprag, having been cast between the spokes of the rotating wheel, strikes against the car still.

Mine cars are not equipped with brakes like freight cars and upon the sprag often depends the safety of the car and more often a train when running downgrade. Sprags must therefore necessarily be very strong and many companies are particular in the specifications of their orders for manufacturing them. Small sprags of not proper thickness are a slight economy, if any, as the frequent breakages entail considerable waste. Also the species of wood used for making them, if not of the requisite strength, hardness, and durability, would in nowise pay in service the expenses of making the sprags.

This industry excludes the softwoods and a number of soft hardwoods, like aspen, yellow poplar, basswood, etc. Chestnut is not suitable owing to lack of sufficient strength, though if easily available and very cheap, it is used to a limited extent. The most practical sprag woods, listed according to amounts, are given in Table 55b following:



Fig. 12.—River scows after being launched, and ready to be taken to market down the Allegheny River.



Fig. 13.—Racing shell being built by a Pennsylvania manufacturer for the University of Pennsylvania.

Table 55b.—Wood for Sprags, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
White oak,	1,091,847	34.27	\$14 00	\$15,286	1,091,847	.....
Hickory,	816,363	25.62	13 51	11,031	816,363	.....
Red oak,	612,845	19.23	14 18	8,701	612,845	.....
Sugar maple,	304,200	9.55	13 55	4,121	304,200	.....
Dogwood,	139,088	4.37	15 73	2,188	139,088	.....
Beech,	92,325	2.90	10 71	989	92,325	.....
Ash,	37,425	1.17	21 54	806	37,425	.....
Locust,	31,350	.98	10 18	319	31,350	.....
Chestnut,	23,205	.73	16 42	381	23,205	.....
Hornbeam (ironwood),	21,684	.68	13 14	285	21,684	.....
Birch,	10,875	.34	14 62	159	10,875	.....
Black gum,	4,500	.14	20 00	90	4,500	.....
Hemlock,	750	.02	13 33	10	750	.....
Total,	3,186,457	100.00	\$13 92	\$44,366	3,181,957	4,500

Over 3,000,000 feet of wood is required annually for making sprags in Pennsylvania. This is not representative of all the material that is used as many of these commodities are made by hand and concerning which it is impossible to get information; others are made elsewhere and shipped in for use in Pennsylvania collieries.

Sprags at present are almost entirely made from young timber, pole size; coppice oak and maple being cut for this purpose. This is often a sacrifice of valuable second growth timber since it is practicable to make this commodity from material considered as waste. In that connection the present report may aid in bringing about the utilization of woods waste, like tops, limbs, cut offs, fire killed poles, etc., the most difficult to market of all the off-fall from lumber operations.

In this connection the Department of Forestry of Pennsylvania recently made a valuable experiment, an outline of the results of which will prove of considerable importance not only to mining companies and others owning their own timber, but to all interested in forest conservation.

During the winters of 1911-12 fire killed a stand of oak and chestnut coppice 14 years old on 75 acres in one of the State Forests in the northeastern part of Pennsylvania. This timber was not merchantable because of the size and distance from market. The Department of Forestry conceived the idea of its sale in the form of sprags and accordingly arrangements were made with an owner of a sprag machine to move onto the tract and use all suitable timber for making this commodity. A contract was made for manufacturing and delivering the finished product to the nearest shipping point for \$9.30 which included, owing to distance, a cost of \$4 for wagon transportation. Eleven dollars was the price received for the finished sprags at the siding, leaving a balance of \$1.70 a thousand pieces for stumpage. The Department of Forestry scored a success in the undertaking partly because of the revenue received from the fire killed timber, otherwise a waste; also by



Fig. 14.—Manufacture of mine sprags in Northern Pennsylvania.

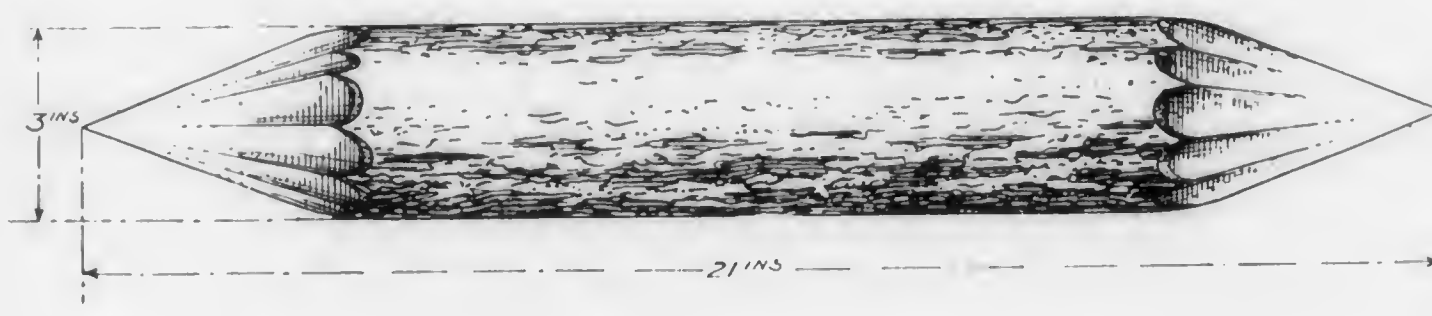


Fig. 15.—Drawing showing standard dimensions of a mine sprag.

this operation a vast amount of what would otherwise have been debris was removed from the woods, assuring less of a tangle when the trees fell and thus allowing a closer fall to the ground and quicker decomposition.

Ten years ago sprags were made with ax and knife, 200 per day being the most one man could produce. Repeated efforts were made to eliminate the manual work by the invention of machinery, but it was not until four years ago that a manufacturer made a successful device which, with the work of two men, enables a possible daily output of from eight to nine thousand sprags. In ordinary commercial runs, however, the average production with this machine is probably not over half the capacity.

FIXTURES.

The fixture manufacturers make certain lines of commodities so closely related to similar ones grouped under the furniture and planing mill industries, that it is difficult at times to determine under which classification they properly belong.

Generally fixtures include furnishings for offices, stores, lodge rooms, saloons, banks, hotel lobbies, lunch rooms, courthouses, churches, dentists' and surgeons' cabinets, account registers, cash registers, index files, and other similar commodities. The materials for making these are distinguished from that going into high class inside house finish such as mantels, colonnades, cabinet work, and general mill work. The latter are stationary, while fixtures are readily portable. From furniture woods they are separated according to the uses of the finished products. Office desks, book cases, store tables, etc., belong to furnishings of business headquarters while commodities of the same name for residences go in the furniture class. Large manufacturers specialize in one or the other lines but in small cities and towns where the local demand does not justify specialization the fixture makers and the planing mills manufacture products belonging to both industries.

Nearly the same woods are employed for fixtures as for furniture but a larger part of the fixture material is of the higher grades. In both industries the woods can be put into two classes, for outside finish and for interior or hidden work. Veneers enter largely into the former class and are growing in favor, chestnut being the favorite backing or core material. For painted work or store counters, bar tops, display racks, show window platforms, and other fixture parts, it is necessary to use solid wood instead of cheaper woods overlaid with veneer. This accounts for the average prices of the woods listed in Table 56 being higher than in the furniture industry.

Yellow poplar, white oak, red oak, and chestnut supply the largest portion of the fixture material in Pennsylvania. Seventy-five per cent. of the quantity used is of these four kinds. Yellow poplar serves both for exterior and interior work. Its adaptability to hold paint and stains, its soft texture and even straight grain make it an easy material to smooth and commend it probably above any other wood for both exterior enameled work and for drawer bottoms, reinforcements, hidden parts of show cases, shelving, interior of wall cases, partitions, etc.

Oak with its ornamental figure is universally the premier fixture wood as it is the foremost furniture wood. Both classes of oaks, red and white, are in demand, and together the amount is greater than that of any other of the woods the Pennsylvania fixture makers purchase. A large part of oak is quartered stock which merely designates the method of sawing. It is the same as rift sawed and arises from first cutting the log into quarters and the quarters into boards, the saw crossing the circles of growth at or nearly at right angles. Oak shows more figure when the log is sliced ordinarily into

boards but the pleasing effect of rift sawing is more in favor and besides being desired by the fixture makers on account of minimum shrinkage and warp. Birch is ahead of any other domestic wood for imitating mahogany. The heartwood of the tree is used for this work. The sapwood has a much lighter color but like the heartwood is specially adapted to take stain and receive and hold a soft brilliant polish. Besides mahogany, birch can readily be stained to imitate cherry, Circassian walnut, fumed oak, bog oak, black walnut, and other pleasing effects. The figure of curly birch is especially attractive and it brings high prices, going into the highest grades of fixtures. Other finishing woods are mahogany, sugar maple, including large quantities of bird's eye maple, cherry, red gum, black walnut, butternut, and Circassian walnut. The last named is the most expensive wood and goes only into the most expensive work. Red gum and butternut are frequently found richly mottled and in some respects resembling Circassian walnut. For that reason they are most frequently used of any domestic wood to be finished in imitation of this foreign wood.

This industry calls on the State for only a limited portion of its raw material. Only a little more than one-third of the total was reported as home cut and of the entire amount of eleven of the woods shipped in from other states, two-thirds were oak and yellow poplar which being demanded in high grades made it necessary to obtain a large portion in regions where the virgin stands of these species are the most abundant. States in the southern Appalachians furnished most of this material. Of the woods listed in the fixture table that are abundantly cut in Pennsylvania the chestnut, birch, sugar maple, basswood, cherry, beech, ash, black walnut, and butternut, most of the supply used was State-grown. The fixture manufacturers, therefore, like the other class of manufacturers using home-grown material should be vitally interested in conservation and the movement looking to the State's future timber supply.

Table 56.—Wood for Fixtures, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Yellow poplar,	2,237,000	18.82	\$37 21	\$83,229	167,500	2,069,500
White oak,	2,127,110	17.89	59 79	127,184	303,600	1,823,510
Red oak,	2,100,350	17.67	41 36	86,902	509,500	1,591,450
Chestnut,	1,803,350	15.17	25 16	45,364	1,114,250	689,100
Birch,	832,300	7.00	36 60	30,461	438,500	393,800
White pine,	452,450	3.81	45 64	20,649	100,450	352,000
Sugar maple,	366,000	3.08	23 17	8,482	317,500	48,500
Mahogany,	332,400	2.80	135 11	44,910	.....	332,400
Basswood,	269,100	2.27	33 92	9,128	176,100	93,000
Red and silver maple,	260,000	2.19	15 00	3,900	260,000	.....
Shortleaf pine,	256,000	2.15	25 92	6,635	.....	256,000
Loblolly pine,	153,000	1.29	22 17	3,392	.....	153,000
Cherry (black),	128,700	1.08	66 14	8,512	83,250	45,450
Cypress (bald),	111,800	.94	37 38	4,179	.....	111,800
Red gum,	94,000	.79	44 00	4,136	.....	94,000
Beech,	71,000	.60	21 85	1,551	60,000	11,000
Ash,	49,900	.42	58 62	2,925	41,000	8,900
Hemlock,	44,300	.37	26 64	1,180	30,300	14,000
Cottonwood,	40,000	.34	38 50	1,540	20,000	20,000
Longleaf pine,	39,500	.33	32 41	1,280	.....	39,500

Table 56—Concluded.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Black walnut,	35,860	.30	82 91	2,973	28,860	7,000
Sugar pine,	25,000	.21	65 00	1,625	.....	25,000
Western white pine,	20,500	.17	46 78	959	.....	20,500
Pitch pine,	20,000	.17	16 00	320	20,000	.....
Butternut,	13,500	.11	44 30	598	13,500	.....
Spruce,	1,500	.01	42 00	63	.....	1,500
Black gum,	1,000	.01	28 00	28	.....	1,000
Hickory,	1,000	.01	65 00	65	1,000	.....
Redwood,	500	*	55 00	28	.....	500
Circassian walnut,	500	*	250 00	125	.....	500
Total,	11,888,220	100.00	\$42 25	\$502,323	3,685,310	8,202,910

*Less than 1-100 of 1 per cent.

CLOTH, HOSIERY BOARDS, ETC.

Cloth boards, commonly called wrapping boards, upon which to wind woolen and other textile goods, hosiery boards used in stocking factories and stores, hammer boards for beating brass and other sheet metals, and lap boards used by the seamstress, are the commodities which have been classed under Table 57. The largest part of the total was for cloth boards and the species used were loblolly pine, shortleaf pine, yellow poplar, and white pine. The size of cloth boards varies from 6 to 8 inches wide and from 16 to 20 inches long and one-fourth to five-eighths of an inch thick.

Sugar maple supplies the entire demand for hosiery boards or driers. They are made of $\frac{1}{4}$ inch material which is strong, dense and not liable to roughen up or splinter. Yellow poplar sufficed for sewing or lap boards and for stocking forms. Because maple does not split easily and is strong and hard, it is preferred of all woods for hammer boards. Considerable material is used in Pennsylvania for the manufacture of ironing and sleeve boards, meat, pastry, and steak boards or planks, but these have been listed and referred to under the industry entitled "Woodenware."

Table 57—Wood for Boards, Cloth, Hosiery, etc., year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Shortleaf pine,	8,000,000	67.94	\$25 00	\$200,000	.....	8,000,000
Yellow poplar,	1,070,000	9.09	29 38	31,440	.....	1,070,000
White pine,	1,000,000	8.49	32 00	32,000	.....	1,000,000
Loblolly pine,	1,000,000	8.49	18 13	18,125	.....	1,000,000
Sugar maple,	705,000	5.99	46 45	32,750	50,000	655,000
Total,	11,775,000	100.00	\$26 69	\$314,315	50,000	11,725,000

PATTERNS AND FLASKS.

Table 58 shows that nearly eleven and a half million feet of lumber are required annually in Pennsylvania for making patterns, flasks, and for other needs of the moulders and foundrymen. Of this amount nearly 80 per cent. is white pine. All of this did not go for patterns, since white pine was demanded for flasks in greater amounts than was any other wood. It is, however, the predominant pattern wood not alone in Pennsylvania, but throughout the country at large. Its suitability is due above all to its susceptibility to hold shape under atmospheric changes, to its grain being close, straight, and even, with obscure figure, to its being easily worked, and at the same time not so soft as to be injured by rough usage, and to its being light in weight and easily portable. Since the pattern must be designed in the exact shape and dimensions of the article to be moulded, the highest grades of lumber are required, and, in many cases, material of considerable width is required and is usually often quarter-sawed, which will not warp as easily as straight sawn lumber cut without regard to grain. These are the factors which have increased the cost of this species to the point of creating a demand for a substitute wood. Thus far no kind of wood experimented upon has been equal to white pine. It will be noticed that the western white pine cut in the Rocky Mountains appears in the table and also the sugar pine of California. Neither of these woods can be distinguished at sight from the eastern white pine. The western white pine is heavier than the eastern, and the sugar pine more resinous. The kinds of wood used for patterns in Pennsylvania are as follows:

White pine.	Yellow poplar.
Cherry.	White oak.
Mahogany.	Black walnut.
Sugar maple.	Butternut.
Sugar pine.	Teak.
Western white pine.	Silver maple.
Redwood.	

Standard patterns, or patterns used often and therefore submitted to considerable wear, are made as durable as possible. For these very hard dense wood is required and mahogany, cherry, butternut, sugar maple, black walnut, and teak wood—the latter a foreign wood—are the ones used in Pennsylvania. Large patterns, like those for moulding massive machine parts can not with economy be used entirely of these woods. Only the parts that come in direct contact with the sand, where the greatest wear is, are made of hardwoods, the inside or filler being of a softer, cheaper wood, and one more easily worked, such as white pine, sugar pine, yellow poplar, or redwood. Mahogany is the best of the hardwoods for patterns, though cherry is the favorite of the domestic woods. These are of even straight grain and less liable to shrink and swell when enclosed in the matrices of damp sand. In addition they stand well the ramming, knocking, and rough usage a standard pattern receives. Sugar maple would be more used than it is were it not for its tendency to warp. Being hard, of straight, compact structure, with a capacity to wear smooth, and easily worked, it otherwise possesses excellent qualities for pattern material.

For flasks lower grades of lumber are required than for patterns. Flasks serve as the frame or box, holding the sand in which to make the mould. A two-part flask is used when the pattern is in two pieces, one resting upon the other, the upper part is the cope, the lower the nowel. Flask material does not last long, its destruction being due more to frequent burning than to the general rough wear. The firing results from intense heat of the sand after the molten metal is poured into the mould. Buckets of water are conveniently

at hand to extinguish a blaze as soon as it is discovered. Wood slow to take fire is the best flask material, though choice is usually limited to kinds near at hand or that are cheap. Redwood, when not too costly is preferred, because it is generally conceded to be more fireproof than any other domestic wood. Coating the inside of flasks with a fireproof chemical has been tried recently as an experiment. Flask woods in order of their importance in Pennsylvania are as follows:

White pine.	White oak.
Loblolly pine.	Pitch pine.
Hemlock.	Norway pine.
Shortleaf pine.	Sugar maple.
Longleaf pine.	White elm.
Yellow poplar.	Red oak.
Spruce.	Beech.
Chestnut.	

The Pennsylvania forests furnished only one-fourth of the total pattern material used. This was probably due to the diminishing stand of white pine timber in the State of the size demanded by the high grade lumber pattern makers. Nearly seven-ninths of all that was used was shipped in from West Virginia, the Great Lakes region, and western states.

Table 58.—Wood for Patterns and Flasks, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
White pine,	9,141,449	79.53	\$56 09	\$512,735	2,276,198	6,865,251
Loblolly pine,	579,000	5.04	20 27	11,738	.....	579,000
Hemlock,	291,500	2.54	18 37	5,356	291,500	.....
Shortleaf pine,	242,012	2.11	20 89	5,056	.....	242,012
Longleaf pine,	234,000	2.04	20 70	4,844	.....	234,000
Spruce,	223,988	1.95	33 63	7,533	44,000	179,988
Redwood,	136,000	1.18	60.74	8,260	.....	136,000
Chestnut,	128,200	1.11	19 24	2,466	47,500	80,700
Cherry (black),	86,894	.76	71 58	6,220	54,644	32,250
Mahogany,	86,268	.75	124 92	10,777	.....	86,268
Sugar maple,	50,550	.44	47 46	2,399	38,850	11,700
Sugar pine,	50,000	.43	85 00	4,250	.....	50,000
Yellow poplar,	46,500	.40	38 82	1,805	37,500	9,000
Pitch pine,	44,000	.38	20 84	917	41,500	2,500
Norway pine,	43,040	.37	28 00	1,205	.....	43,040
Western white pine,	28,000	.24	56 93	1,594	.....	28,000
White oak,	24,000	.21	39 50	948	24,000	.....
White elm,	15,000	.13	33 00	495	.....	15,000
Black walnut,	14,500	.13	50 00	725	4,500	10,000
Red oak,	12,000	.10	25 00	300	12,000	.....
Beech,	10,000	.09	25 00	250	10,000	.....
Butternut,	5,210	.05	79 85	416	3,900	1,310
Teak,	1,400	.01	250 00	350	.....	1,400
Red and silver maple,	1,000	.01	55 00	55	1,000	.....
Black gum,	500	*	24 00	12	.....	500
Total,	11,495,017	100.00	\$51 39	\$590,706	2,887,092	8,607,919

*Less than 1-100 of 1 per cent.

HANDLES.

Other states take precedence over Pennsylvania in the quantity of wood annually consumed in the manufacture of handles, but it is probable that none surpasses it in the different kinds of handles made. The principal ones reported have been listed and the woods from which they are made arranged in order of quantity as follows:

<i>Are Handles.</i>	<i>Fork Handles.</i>
White ash.	White ash.
Hickory.	Cherry.
White oak.	
<i>Brick Trowel Handles.</i>	<i>Grab Maul Handles.</i>
Dogwood.	Hornbeam.
Persimmon.	Hickory.
<i>Broom Handles.</i>	<i>Hammer Handles.</i>
Basswood.	White ash.
Beech.	Hickory.
Sugar maple.	
Birch.	<i>Hatchet Handles.</i>
<i>Butcher Knife Handles.</i>	Hickory.
Birch.	White ash.
Beech.	
Sugar maple.	<i>Hay Knife Handles.</i>
<i>Cant Hook Handles.</i>	White ash.
Sugar maple.	<i>Hoe Handles.</i>
Hornbeam.	White ash.
Hickory.	Sugar maple.
<i>Carrying Poles.</i>	Beech.
Hornbeam.	Birch.
Hickory.	<i>Instrument Handles.</i>
<i>Chisel Handles.</i>	Rosewood.
Hickory.	Ebony.
<i>Coal Pick Handles.</i>	<i>Jack Handles.</i>
White oak.	Hickory.
Sugar maple.	Sugar maple.
White ash.	
Sweet birch.	<i>Mallet Handles.</i>
Hickory.	Dogwood.
<i>Concrete Rammer Handles</i>	Hornbeam.
Hickory.	Hickory.
Hornbeam.	<i>Maul Handles.</i>
<i>Crosscut Saw Handles.</i>	Hickory.
Beech.	<i>Mop Handles.</i>
Sugar maple.	Beech.
Hickory.	Sugar maple.
<i>Door Knobs.</i>	Birch.
Sugar maple.	Basswood.
<i>D-Fork Handles.</i>	<i>Peavey Handles.</i>
White ash.	Hornbeam.
<i>D-Shovel Handles.</i>	Hickory.
White ash.	
Sugar maple.	<i>Pick Handles.</i>
	Hickory.
	White oak.
	Hornbeam.

Pipe Wrench Handles.
Basswood.

Plastering Trowel Handles.
Basswood.

Pole Brush Handles.
Basswood.
White ash.
Shortleaf pine.

Rake Handles.
Sugar maple.
Beech.
Birch.
Ash.

Saddler's Tool Handles.
Black walnut.

Sad Iron Handles.
Red gum.

Sad Rammer Handles.
Hickory.
Hornbeam.

Saw Frames.
Red Oak.
Birch.
Sugar maple.

Saw Handles.
Red gum.
Sweet birch.
Applewood.
Beech.

Spade Handles.
White ash.
Black ash.

Spud Handles.
Hickory.
Hornbeam.
Sugar maple.
Beech.

Stomper Handles.
Hornbeam.
Hickory.

Street Brooms.
Beech.
Sugar maple.
Hickory.

Track Tool Handles.
White oak.
Hickory.
Sugar maple.
White ash.

Hickory is unquestionably the best wood used for long-handle tools, including the maul, axe, striking hammer, sledge, and track tools used on railroads for construction work and for maintenance of way. Besides exceptional strength, this wood possesses other important qualities for handle material,—weight, stiffness, shock-resisting ability, and susceptibility to wear smooth by use. Manufacturers of this class of handles usually specialize in this line, since the processes of manufacture and the machinery required are distinct from those employed in making other classes. Hickory is becoming scarcer each year, and this fact has induced a number of northern handle makers to move southward nearer to the source of the largest supply. Not a few firms, however, continue to maintain factories in the north and to ship billets, bolts, and rough-turned handle stock from the south to the north as far as Connecticut and New Hampshire.

It is interesting to note from the following table that the Pennsylvania hickory handle manufacturers procure 66 per cent. of their raw material from the State. It would be well for farmers and timber owners in Pennsylvania who own stands of hickory to understand the increasing demand for the wood for handles and that second-growth hickory is preferred. This tree is not a rapid grower but it is not so slow as many other trees and it will soon prove a good investment to preserve stands of second-growth hickory to aid their development, and to cut the timber only as it becomes large enough for handle bolts. The list given below shows the kinds of wood which are being tried as substitutes for hickory in handle making, white oak, cow oak, swamp oak, sugar maple, hornbeam, and ash being the principal ones. For coal-pick handles these woods are suitable and most largely used, there being less strain as to strength and shock-resisting than if used for the more strenuous work of the pick, axe, and maul.

The manufacture of fork and garden tool handles is another distinct class of this industry. What hickory is for the axe, pick, and sledge, white ash is to this class, namely, the pitch-fork and hay-fork, the long handle and D-shovel, and the hoe, rake, etc. Stiffness, toughness, and strength without excessive weight are the properties which commend ash for this use. It is surprising that the handle manufacturers demanding this wood procure only 58 per cent. of their requirements from State-grown woods. This condition offers another opportunity to timber owners to encourage the growing of ash for handle stock, to meet the demand of the increasing home market. In forest management ash is an important tree. It is a fairly rapid grower and is not particular as to situation, as are many other trees.

Other woods serve with ash for meeting the demand for this class of handles, but they are used in considerably smaller quantities. In the order of their importance, they are sugar maple, beech, birch, and cherry. In other states elm, sycamore, and soft maple are included.

More wood in Pennsylvania is required for broom and mop handles than for any other class, and like hickory handles, the manufacturer makes no other kinds. The maples, chiefly sugar maple, the birches and beech because they turn well and wear smooth in use, and to a less extent, basswood, red gum, ash, and sycamore, are the broom and mop handle woods; and all of them are reported being used in Pennsylvania. Sugar maple is preferred and only a few years ago was most used. Its demand for other uses at higher prices is probably the chief cause for bringing birch into first place. High grade material is required for broom handles and squares are usually cut direct from the log, the less desirable being put into mop handles. Mop handle squares were found being bolted in Pennsylvania from slabs and edgings of sawmills cutting beech, birch, and maple.

For handles where weight is not an objection and strength is the foremost consideration, hornbeam or ironwood has been found very satisfactory. Cant hook and peavey handles, stomper and rammer handles are examples.

Applewood is very well adapted for handsaw handles, being hard, sufficiently strong, of uniform texture, and susceptible of high polish. The attractive uniform color has caused it to become the principal wood for better grades of handles. Red gum, cherry, and sweet birch have proved satisfactory for saw handles, but more because they can be finished to resemble applewood closely than because of any other special quality which they possess. Beech furnishes the material for cheaper grades. Its color is against it and also the fact that it is not capable of high polish, but its toughness and greater strength and ability to wear smooth probably make it nearly equal to applewood. Other woods used for saw handles but not reported in Pennsylvania are mahogany and black walnut. Saw frames for buck saws are of red oak, birch, and maple and handles of crosscut saws are of sugar maple, hickory, and beech.

The bricklayers' trowels have handles of dogwood and persimmon. These woods are dense in structure and among the hardest domestic woods and therefore best stand the wear for use as a hammer for imbedding the brick into mortar after placing it. The plaster trowels are made of basswood. Being porous this wood absorbs the moisture from the wet hand of the mechanic and it is claimed does not slime. In the New England states popple or aspen is used for the same reason.

Table 59.—Wood for Handles, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Hickory,	3,973,350	36.07	\$31 97	\$127,045	2,599,300	1,374,050
Sugar maple,	2,307,850	20.95	19 02	43,897	1,727,700	580,150
Ash,	1,969,750	17.88	28 45	56,032	1,130,750	339,000
Beech,	1,752,300	15.91	17 31	30,412	1,302,800	449,500
Hornbeam,	415,500	3.77	49 53	20,580	315,500	100,000
Birch,	207,750	1.89	18 13	3,766	205,250	2,500
Red gum,	195,000	1.77	29 38	5,730	.....	195,000
White oak,	59,000	.54	27 42	1,618	59,000	.....
Applewood,	50,000	.45	40 00	2,000	25,000	25,000
Basswood,	41,200	.38	29 73	1,225	41,200	.....
Red oak,	15,000	.14	17 50	263	15,000	.....
Shortleaf pine,	12,000	.11	30 00	360	.....	12,000
Cherry (black),	7,500	.07	50 00	375	2,500	5,000
Persimmon,	7,000	.06	54 00	378	.....	7,000
Black walnut,	1,050	.01	81 90	86	1,050	.....
Ebony,	327	*	305 81	100	.....	327
Dogwood,	230	*	67 57	16	.....	230
Rosewood,	100	*	360 00	36	.....	100
Total,	11,014,907	100.00	\$26 68	\$293,919	7,425,050	3,589,857

*Less than 1-100 of 1 per cent.

LAUNDRY APPLIANCES.

The fourteen woods demanded by the Pennsylvania manufacturers for making laundry accessories are listed in Table 60 following and they aggregate a cut of over nine million feet. Four woods, sugar maple, beech, birch, and yellow poplar, contributed nearly 70 per cent. of the total. Of these sugar maple is the most important, in quantity furnishing more than one-half of the entire demand. Four woods were cut entirely outside of the State but nearly three-fourths of the aggregate employed grew in Pennsylvania, showing to what extent this industry is dependent upon the forest resources of the State and why manufacturers should be interested in the movement to protect and improve the forests.

Clothespins are the smallest commodity grouped under this heading but they are not the least important as more wood is used for their manufacture than for any other laundry product. Over four million feet is the amount annually required. Fine grained beech and sugar maple in nearly equal quantities were the principal woods used. The other kinds include birch and yellow poplar. The last named and maple also are used for making clip pins, which are two wooden scales held together by a wire spring. The woods used in Pennsylvania as clothespin material are the same as those used in other states except in Virginia where the manufacturers report black gum, both the water gum and cotton gum varieties, which in those parts are indiscriminately called black gum. Three processes are necessary in the manufacture of clothespins, (1) the rough billets are turned to proper form, (2) they are put through another machine which slits them, (3) they are finally consigned into revolving cylinders to be tumbled or smoothed by abrasion.

Ironing boards and stands are an important part of this industry and the woods used are selected according to their fitness for the several parts. The frames or the collapsible stand upon which the boards rest require a strong wood and one that turns readily. Sugar maple and beech are reported in Pennsylvania while in Michigan elm and yellow birch joined with these in furnishing this material. Ironing boards are preferably of a wood that is soft and easily smoothed and one that in the presence of high temperature holds its shape well. It should be made of light weight wood so as to be easily portable. Cottonwood answers well but buckeye, basswood, yellow poplar, and white pine are probably the favorites. Besides regular-size ironing boards, these woods were also reported for skirt and sleeve boards used for specialty work.

Beech, birch, and maple, because they are strong, tough, and not easily split, were reported for making clothes racks, sometimes called horses, and for clothes driers. Light weight wood like basswood or aspen were used for the stringers. The racks are made of turned stock and fold together like a screen. The driers are revolving reels through the arms of which wire is strung for hanging clothes. These include the ones that are temporarily attachable to back porches of apartment buildings and also the kinds that are placed in back yards. Adjustable curtain stretchers used in laundering lace and other thin fabric window curtains are included in this industry. Basswood was the only wood used while a large amount of loblolly pine was called on for clothes props.

Mangles are ironing machines used for domestic purposes in ironing flat work such as table and bed linen, towels, handkerchiefs, etc. In appearance they resemble clothes wringers, having their rolls operating at a tangent. Some of them are intended only for cold ironing or smoothing. In these the rolls are of wood and the pressure of the rolls alone does the work giving the clothes the same smooth appearance as if hot ironed. In Pennsylvania they are made alone of sugar maple but the Michigan report also shows beech and elm though in much smaller quantities. Machines are also made for hot ironing and in these the upper roll is hollow metal heated while the lower one is wood covered with padding and a top dress of muslin. Mangle rollers vary in size from 3½ inches in diameter and 20 inches long to 6 inches diameter and 24 inches long.

Washing machines are of various designs and shapes, some in box form, some conical shape similar to a wash tub, and others are cylindrical. The last named is the design used in steam laundries. Cypress is more suitable than any other wood for washing machine bodies because it is less liable to warp and more durable in situations of alternating moisture and dryness. Ash and to a small extent white pine were also reported. Of the Pacific coast woods, redwood seems to give the best result. On account of the strength of sugar maple it was called on for the legs of washing machines; and beaters or agitators which work inside of the machine to turn the clothes in washing are made of beech or maple.

The reasons which commend cypress for washing machines make it the principal wood for wash tubs. In Michigan spruce was the favorite wood while the Illinois manufacturers used cypress, cotton gum, and red gum in the order named. The increasing use of these woods, especially cotton gum, which is tupelo, is worthy of note.

For washboards, the manufacturers require woods that are light in color, especially for the print board, which is stenciled. Yellow poplar alone is called on in this State but in Ohio, Illinois, and Michigan, basswood, cottonwood, and cotton gum were demanded. Washboard sides or posts are

made from beech and sugar maple. The former is more extensively used. The rubbing surface at one time was made of maple and beech, but now metal or glass rubs have been substituted.

Table 60.—Wood for Laundry Appliances, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Sugar maple,	6,340,500	58.73	\$23 75	\$150,613	3,385,500	2,955,000
Beech,	1,432,000	13.26	15 95	22,542	1,352,000	80,000
Birch,	1,090,000	10.10	12 72	13,860	1,070,000	20,000
Yellow poplar,	610,000	5.65	16 44	10,030	500,000	110,000
Cottonwood,	500,000	4.63	32 90	16,450	.....	500,000
Basswood,	437,000	4.05	32 52	14,210	108,500	328,500
Yellow buckeye,	125,000	1.16	28 00	3,500	125,000	.....
Red and silver maple,	80,000	.74	25 00	1,990	42,500	37,500
White pine,	78,200	.72	35 92	2,809	25,000	53,200
Cypress (bald),	39,000	.36	39 10	1,525	.....	39,000
White oak,	30,000	.28	23 50	705	10,000	20,000
Red oak,	30,000	.28	23 50	705	10,000	20,000
Chestnut,	3,000	.03	24 00	72	2,000	1,000
Ash,	1,000	.01	25 00	25	1,000	.....
Total,	10,795,700	100.00	\$22 17	\$239,336	6,631,500	4,164,200

CIGAR BOXES.

Cigar boxes are the only wooden tobacco containers made in Pennsylvania and the woods required solely for this purpose are listed in Table 61. In a number of southern states, plug and twist tobacco boxes were included with cigar box lumber and the factories known as the tobacco box industry. Cigar box material is bought as thin lumber and veneer, the former usually 5-32 of an inch in thickness. This material, as is customary in commerce, was reported in terms of superficial feet. To make it comparable with the other tables of this report, however, it was reduced to board measure and valued on that basis. For this reason the cost of the material may appear somewhat high, especially since the cost of manufacture has not been eliminated nor has any allowance been made for waste. The prices range from \$20 to \$30 per thousand feet surface measure for Spanish cedar, \$12.50 to \$16.50 for yellow poplar and basswood and \$14 to \$17.50 for cotton gum and red gum.

Though the eastern part of Pennsylvania raises the best grades of leaf tobacco, the center of the cigar box industry is not located there but in the Pittsburgh region where the manufacture of stogies and cigars has gained a reputation.

Spanish cedar, it is claimed, gives a delicate odor to the cigars which is attributed to no other wood. This accounts for the fact that it is the principal cigar box wood not only in Pennsylvania but in the country at large. Spanish cedar is native to the West Indies and Central America and is brought to this country in log form to be manufactured. It is a broad leafed tree and not a relative of the domestic cedars or junipers which are conifers.

Not all of the Spanish cedar goes into cigar boxes as thin lumber. Much of it is veneer glued to a native wood that is thicker and this two-ply stock supplies a large part of the demand of the cigar box material and at a price considerably below that asked for Spanish cedar lumber. Yellow poplar, cotton gum, basswood, and red gum are the domestic woods which furnish most of the veneer backing. Yellow poplar is used in larger quantities in Pennsylvania than the combined amounts of the three other woods, probably because western Pennsylvania is near to the center of the yellow poplar lumber producing region. This region, together with a part of Pennsylvania, includes mainly West Virginia, eastern Kentucky, Tennessee, and southern Ohio. Tupelo or cotton gum and red gum are equally well suited for built-up material. They work easily and with the recent improvement in kiln drying veneer the objection formerly made to their tendency to twist and warp has been largely overcome. The decreasing supply of yellow poplar and its large demand for many other uses are bringing cotton and red gum rapidly to the front for this line of manufacture.

The domestic woods used are not all overlaid with Spanish cedar veneer. They are extensively cut to full thickness for boxes of solid lumber. To give these woods a cigar box appearance, which means to make it resemble Spanish cedar, the process of stamping is resorted to and improvements in this line give it an effect which makes it difficult without close inspection to distinguish the imitations from the cedar. Where domestic woods are independently used, most often the inside of the box is covered with litho paper, advertising the name of the cigar and maker. Waste in cigar box manufacture is largely utilized; the ends and sides can be made from what is left after cutting the tops and bottoms.

Table 61.—Wood for Cigar Boxes, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Spanish cedar,	5,800,160	58.41	\$112 71	\$653,735	.....	5,800,160
Cotton gum,	2,043,917	20.58	63 37	129,519	.....	2,043,917
Yellow poplar,	1,041,923	10.49	75 31	78,465	24,500	1,017,423
Red gum,	549,750	5.54	49 79	27,373	.....	549,750
Basswood,	495,000	4.98	64.95	32,150	.....	495,000
Total,	9,930,755	100.00	\$92 77	\$921,242	24,500	9,906,255

WOODENWARE AND NOVELTIES.

The commodities produced by the factories grouped under this industry are many and varied. This accounts for the twenty different woods listed in Table 62, including small quantities of two foreign woods, rosewood and lignum-vitae. The total consumption of wood in this industry was over eight and one-half million feet annually and beech, mostly home-grown, was used in quantities greater than the total of any other five woods listed. Basswood represented the greatest amount of shipped-in material, a little over three-fourths of it coming from New York and West Virginia.

Woodenware refers to useful household articles, such as pails, buckets, freezers, hose reels, snow shovels, rat and mouse traps, comb boxes, broom holders, and towel racks, and also to utensils important in the equipment of kitchens, such as pastry and pie boards, meat boards, rolling pins, slaw cutters, fish and steak planks, lemon squeezers, potato mashers, etc. A portion of the pails made by this industry in Pennsylvania is for candy packages. Though these may more properly belong to the box industry, they have been included here with other pails and buckets, the method of manufacture being identical and the same factories making both styles. While white pine is the favorite wood for pail staves in Pennsylvania, as it is in nearly all other states where this industry is important, a few of the softer hardwoods like basswood, yellow poplar, buckeye, and willow are also employed. Bales or handles of buckets are rarely made by the pail manufacturer. The variety wood-workers or manufacturers specializing in all kinds of turnings furnish them. Beech, birch, and maple are used in the largest quantities.

Mouse traps belong to this industry. They are made of beech, yellow poplar, red gum, sugar maple, and white elm in the order named, and over 1,500,000 feet of these woods are annually required for their making. Sugar maple and holly were used for rolling pins, the latter being shipped from Arkansas and being desired because of its density, toughness, whitish color, and its capacity to turn well. Beech being strong and not imparting a taste went for lemon squeezers except for the bowls which required a harder, denser wood. Lignum-vitae, sent in from the West Indies, was found most suitable and is used for expensive squeezers while glass bowls answered for cheaper ones.

Planks for cooking planked fish and steaks have been made for years from one wood, principally white oak. Originally a common surfaced oak board met the demand but now they are manufactured in various shapes and sizes to fit the holders into which they are placed for service. To keep the essences from running off the plank they are frequently grooved which adds also to their appearance when not in use. Rosewood was the only foreign wood reported for toddy sticks but sugar maple and beech are most commonly used.

Novelties are of so many different kinds that space here will not allow an attempt to name them. Novelty makers themselves can hardly list all the different articles they make because they produce specialties of all kinds, mostly to order, and usually have no standard lines. Those marked with an * in the legend of the accompanying illustration will give an idea of the class of commodities included as novelties.

Table 62.—Wood for Woodenware and Novelties, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Beech,	3,639,000	42.44	\$20 46	\$74,446	3,356,000	283,000
Sugar maple,	1,040,500	12.13	23 34	24,280	737,500	303,000
Basswood,	944,000	11.01	24 26	22,905	228,500	715,500
Ash,	634,500	7.40	30 67	19,462	259,500	375,000
White elm,	500,000	5.83	28 00	14,000	.....	500,000

Fig. 16.—Tier bins for a provision store, just completed by a fixture manufacturer of Pittsburgh.



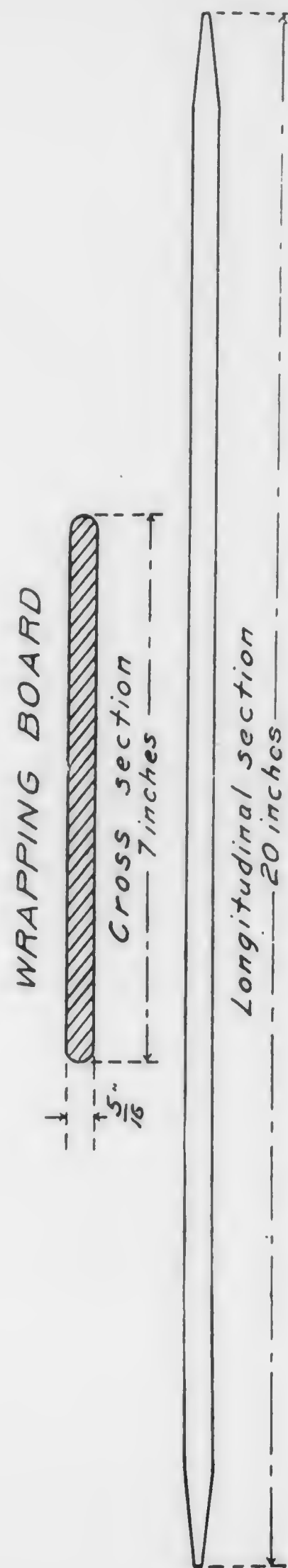


Fig. 17.—Drawing showing standard dimensions of a wrapping board.

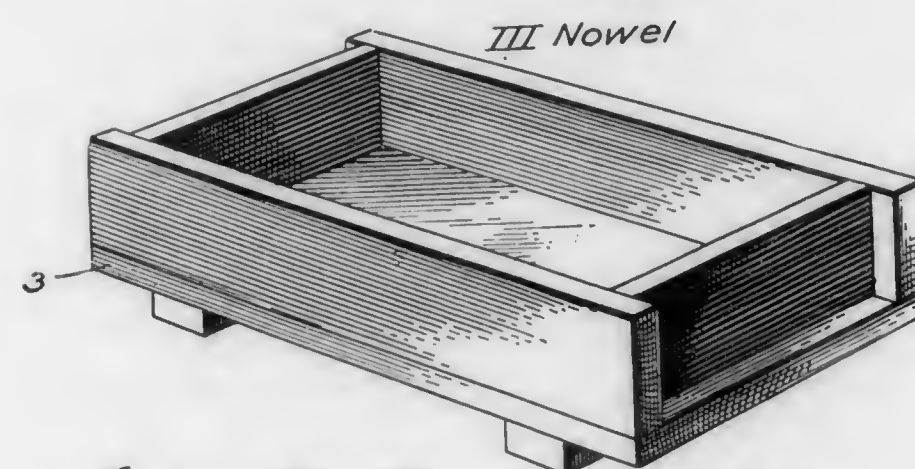
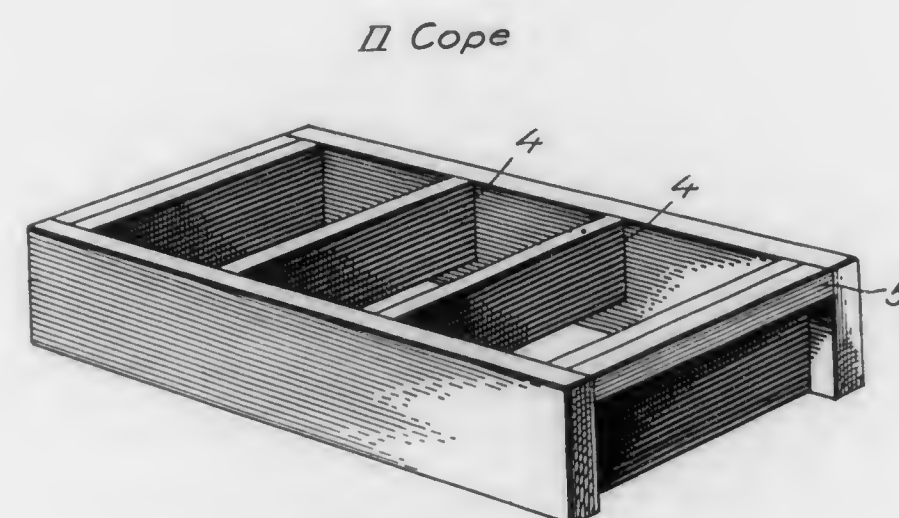
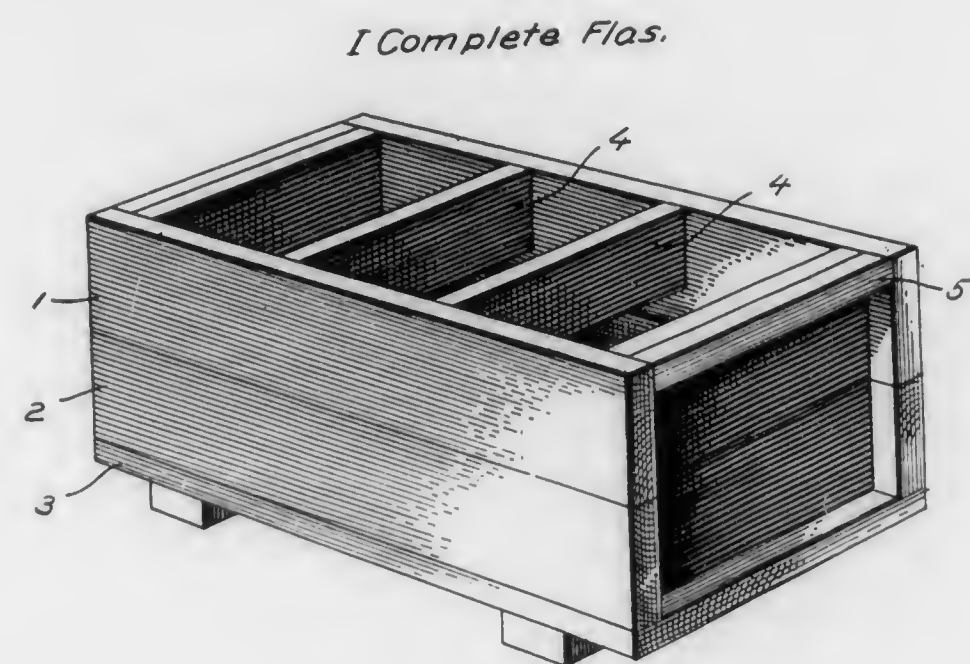


Fig. 18—Foundry Flasks

Fig. I—1. Cope
2. Nowel

3. Bottom board
4. Cope bars
5. Handles

Fig. II—4. Cope bars
5. Handles

Fig. III—3. Bottom board



Fig. 19.—Sixty different kinds of novelties made by one manufacturer of Pennsylvania.

DESCRIPTION OF FIGURE 19.

- *1. Plumber's turnpin—dogwood.
2. File handle—black walnut.
3. Candlestick—soft maple.
4. Drift plug (plumber's)—dogwood.
- *5. Banner pole emblem—yellow poplar.
- *6. Banner pole emblem—yellow poplar.
7. Turned handles, bench tools—sugar maple.
8. Rolling pin—sugar maple.
9. Bench rammer, foundry tool, made from 10.
10. Rough square—sugar maple.
11. Ten pin, made from 10.
13. Duck pin, made from 12.
15. Indian club made from 14 (rough square)—yellow poplar.
- *16. Gavel—rosewood.
17. Tinner's mallet—lignum-vitae.
18. Carpenter's mallet—dogwood, maple handle.
19. Dental mallet—dogwood.
- *20. Flag pole top—sugar maple.
21. Foundry mallet—dogwood, maple handle.
22. Spoons—soft maple.
- *23. Baseboard, mounting used by taxidermist—red oak.
- *24. Watch case frame—yellow poplar.
25. Plasterer's hook—sugar maple.
28. Bung starter, made from rough square 27—dogwood.
- *29. Candle pedestal—yellow poplar.
- *31. Policeman's club—rosewood, made from rough square 30.
- *33. Watchman's billy—mahogany, made from rough square 32.
34. Spigots—red cedar.
35. Spigot, oil barrels—red cedar, two unfinished parts.
- *36. Fid (rope slicer)—hickory.
37. Air pump handle—hickory.
38. Large and small plumber's dressers—lignum-vitae.
39. Bottle corker—sugar maple.
- *40. Lemon squeezer—sugar maple with cup and filler—lignum vitae.
42. Bolt—lignum-vitae.
45. Ten pin ball made from 42.
- *46. Bull's eye used as a rope tie on ships—lignum vitae.
47. Electrical apparatus part, 9 layers glued—mahogany.
- *48. Gavel—ebony.
- *49. Alms plate—black walnut.
- 50, 51 and 52. Coopersmith's mallet—dogwood and water gum, hickory handle.
57. Bolt—water gum.
60. Maul—hickory, handle made from 57.
61. Maul—hickory, handle made from 62.
62. Bolt—water gum.
67. Maul—hickory, handle with bark made from 62.
68. Kraut stamper—sugar maple, handle made from 70.
70. Bolt—water gum.
- *71. Pedestal for loving cup—red gum.
- *98. Candlestick—mahogany.

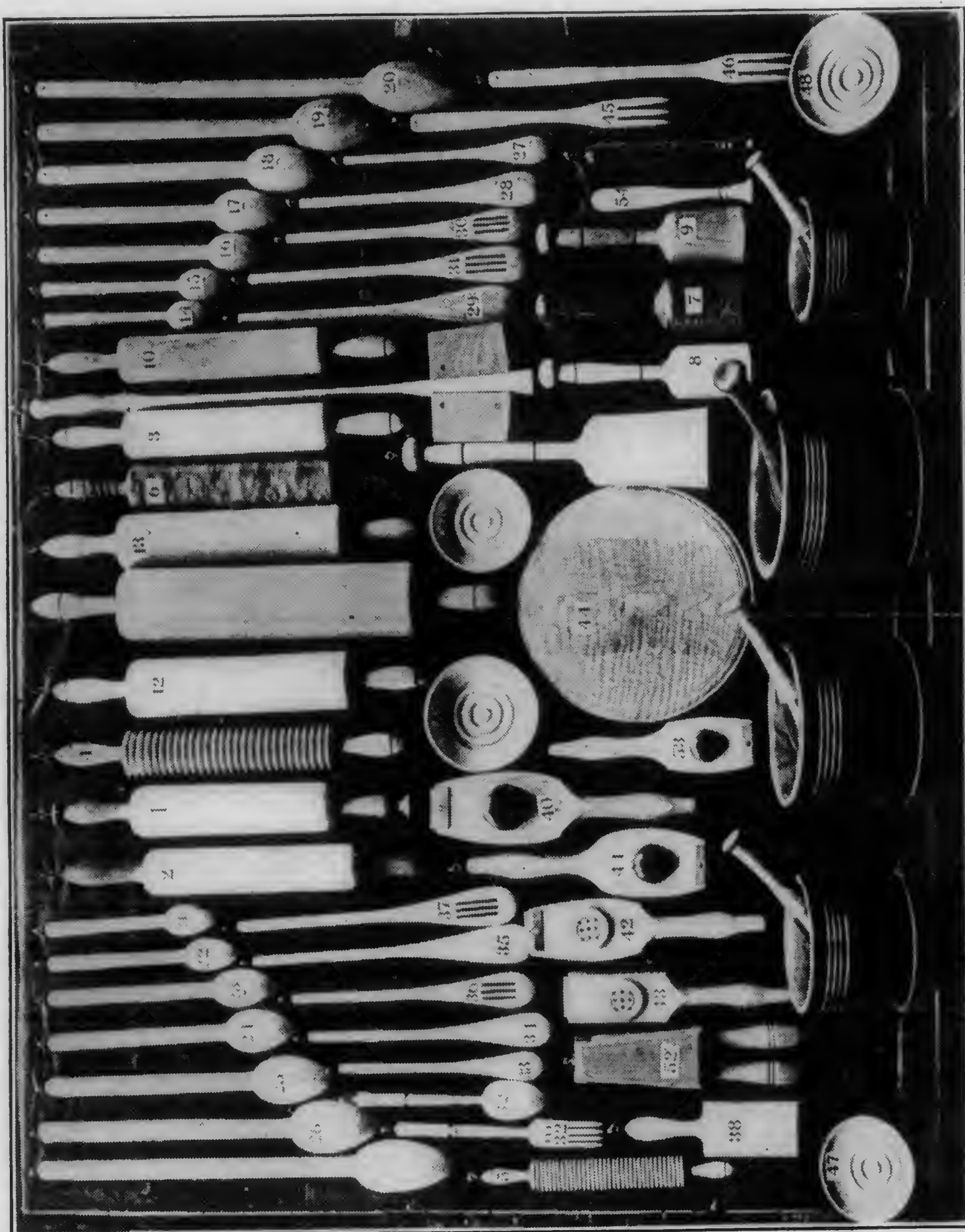


Fig. 20.—Product of a woodenware manufacturer of Philadelphia.

Table 62—Concluded.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Yellow poplar,	482,500	5.63	29 11	14,045	27,500	455,000
Birch,	466,500	5.44	25 95	12,105	230,000	236,500
Red gum,	225,000	2.62	23 50	5,287	.....	225,000
White pine,	225,000	2.62	11 78	2,650	225,000	.....
Red and silver maple,	210,525	2.45	14 43	3,038	210,525	.....
Yellow buckeye,	83,700	.98	25 00	2,092	.....	83,700
Holly (American),	60,000	.70	100 00	6,000	.....	60,000
White oak,	26,300	.31	31 64	832	25,800	500
Willow,	25,000	.29	13 00	325	25,000	.....
Cotton gum,	6,900	.08	20 00	138	.....	6,900
Hickory,	2,500	.03	60 00	150	2,500	.....
Spruce,	1,000	.01	43 00	43	.....	1,000
Red oak,	800	.01	40 00	32	800	.....
Rosewood,	555	.01	245 05	136	.....	555
Lignum-vitæ,	500	.01	350 00	175	.....	500
Total,	8,574,780	100.00	\$23 57	\$202,141	5,328,625	3,246,155

TANKS, VATS, AND SILOS.

The market for wooden tanks is broadening in spite of the fact that metal tanks are used to a considerable extent. In no other line is there a greater increase in demand for this commodity than by factories where tanks are needed to furnish water for manufacturing and engineering purposes. They are usually elevated to the top of the factory buildings, but most frequently on towers varying in height according to the pressure desired. Water tanks along railroads are in this class and southern white cedar, cypress, white pine, and longleaf pine, in the order of quantity, are the woods used for the staves. Shortleaf pine and hemlock went for tank covers. Tank staves are made of heavy material, the thickness varying according to the size and use of the tanks. Often the staves are as much as three inches thick and they must of necessity be made of the best grade of lumber since tanks are subject to strong pressure besides continued atmospheric changes, and the influence of water and other liquids has a deteriorating effect.

In selecting material for tank and vat staves the manufacturer is guided mainly by the use to which the finished commodity is to be put, as there are qualities in the several woods which commend them for certain kinds. The distillers and vinegar makers prefer yellow poplar for keeping-vats, but yellow poplar in some localities is too costly and its place has been taken by cypress and white pine. Brewery vats are usually of cypress and white oak. These woods are durable and strong and have no effects upon the taste and odor of the contents. Where a tank is closed and fermentation active or where one of extra resisting power is needed, white oak is preferred because close grained, heavy, and strong. Southern white cedar is also a favorite and though not so strong as white oak, when used it is strongly reinforced.

Vats for the manufacture of oleomargarine are of white pine, cypress, and Douglas fir, while those in pickle factories are generally cypress, Douglas fir, and longleaf pine. Individual oil tanks call for white pine, white oak,

and chestnut. The use of the last named wood is interesting since Pennsylvania is the only state in which this wood has been reported for tank staves. It may be in the future that it will be called on more generally for this use owing to its being cheaper than most other tank woods and being sufficiently strong and durable. The tanners are not particular as to the kinds of woods used for their tanks, durability and strength being the principal considerations. Cypress and southern white cedar were the most prominent, the latter because of durability being the best qualified.

The silo is given a place in this industry because generally it resembles a tank both when built and in its component parts and occasionally makers of tank stock also manufacture silos. The processes of manufacture of both, though not identical, are similar. The up-to-date farmer regards the silo as an almost indispensable part of his equipment as it furnishes a means of having succulent forage during the winter season. The demand for silos is growing rapidly and large quantities of high grade lumber go for their making. Longleaf pine, Douglas fir, cypress, red or Norway pine, and white pine are the silo woods the Pennsylvania manufacturers report. White pine is probably the best known, as it has been used longer than any other and is the only home grown pine reported. Its high price probably accounts for its use only in small quantities. Because cypress is durable in damp situations, it is regarded one of the best silo materials and in some localities is preferred even above white pine. Next to southern white cedar it will outlast any other wood for silos. Longleaf pine from the South and Douglas fir from Idaho and Oregon are extensively used and are favored because staves can be made from them in sufficient lengths for one piece staves. Silos of this character are more easily erected than when the staves are in two or three pieces. These woods do not twist or warp; they are close-grained, strong, unaffected by acids or juices of the plants and are cheaper. Redwood is meeting a growing demand for staves according to silo makers in other states but none was used in Pennsylvania. It is claimed that redwood, next to cypress, is the most durable wood, can be gotten in long lengths, is free from sap and knots, is not given to check and warp, and will answer both for silos in exposed situations as well as for those built into barns.

Table 63.—Wood for Tanks and Silos, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Longleaf pine,	2,565,000	32.66	\$26 57	\$68,150	.....	2,565,000
Southern white cedar,	2,554,000	32.52	36 31	92,740	.....	2,554,000
Cypress (bald),	1,138,000	14.49	56 32	64,090	.....	1,138,000
White pine,	820,000	10.44	34 84	28,570	60,000	760,000
Douglas fir,	450,000	5.73	43 33	19,500	.....	450,000
Spruce,	100,000	1.27	30 00	3,000	.....	100,000
Shortleaf pine,	86,200	1.10	29 47	2,540	.....	86,200
White oak,	50,000	.64	43 00	2,150	50,000	.....
Norway pine,	50,000	.64	35 00	1,750	.....	50,000
Hemlock,	25,000	.32	18 00	450	25,000	.....
Chestnut,	15,000	.19	20 00	300	15,000	.....
Total.	7,853,200	100.00	\$36 07	\$283,240	150,000	7,703,200

MACHINE CONSTRUCTION.

Most parts of the machinery equipment of paper mills, flour mills, ice factories, sawmills, cotton gins, etc., are made of iron and steel, but for others wood is required and it is the different kinds of lumber for making these parts that are listed in Table 64. Electrical machinery parts and other electrical apparatus are not included in this class. This information will be presented subsequently as a separate industry. It is natural to infer that wooden parts of machinery must, in a great number of cases, call for lumber of great strength. It is not surprising, therefore, to find that white oak is the preponderant wood, comprising over one-third of the total and that longleaf pine and hickory follow it in quantity. The largest amount of hickory in the form of plank is shown in this industry. The vehicle and handle makers report using more but their raw material is in billet form, in squares, and in bolts. Douglas fir is the only Pacific coast wood listed. Like longleaf pine it possesses considerable strength and because the trees grow large and of great height, timber of large dimensions and length can readily be obtained. This probably accounts for its appearance in this industry, far from where it is cut. The average price is nearly twice that of longleaf pine.

Machine parts must necessarily be made from high grade lumber and in this connection it is interesting to note that nearly 55 per cent. of all that was reported was grown in the State. The factories included in this industry are numerous, though compared with other industries they use small amounts of wood. The fact that the requirements of these manufacturers are met so largely by the forests of the State should elicit their interest in the movement to protect forests and thereby perpetuate the State's timber supply. Some parts of 14 of the 19 woods listed in the table were cut in Pennsylvania, and their principal uses have been arranged in the order of their importance as follows:

Bins (Road Equipment).

Shortleaf pine.

Breaker.

Yellow poplar.

Cider Mills.

Yellow poplar.

Clay Working Machinery.

Hemlock.

Cranes.

Yellow poplar.

Coal Mining Machinery.

White oak.
Hickory.
White ash.
Shortleaf pine.
Maple.
Birch.
Basswood.
Yellow poplar.
Chestnut.
Hemlock.

Derricks.

White oak.
Cork elm.
Sugar maple.
Douglas fir.

Elevators.

Red oak.
Chestnut.
Longleaf pine.
Yellow poplar, (feed mills).
Basswood.
White oak.

Engine and Machinery Skids.

Beech.
Sugar maple.
Hemlock.
Hickory.

Flour and Feed Mill Machinery.

Red oak.
Yellow poplar.
Longleaf pine.
Sugar maple.
Hickory.
Chestnut.
White ash.
White pine.

General Mill Machinery.

White pine.
Longleaf pine.
Sugar maple.
White oak.
Cypress.

Hoists.

Yellow poplar.
Sugar maple.
Hickory.

Horse Power Machinery.

Sugar maple.
Yellow poplar.

Ice Machines.

White oak.
Red oak.
Longleaf pine.
White ash.

Oil Well Machinery.

White oak.
Red oak.
White pine.
Shortleaf pine.
Hemlock.
Sugar maple.
Beech.
Douglas fir.
Longleaf pine.

Ore Machinery.

Red oak.
Chestnut.

Paper Mill Machinery.

White oak.
Yellow poplar.
Longleaf pine.
Sugar maple.

Push Poles.

Hickory.
Ash.

Road Scrapers.

Longleaf pine.
White pine.

Road Engine Parts.

Yellow poplar.
Red oak.
White oak.
White pine.

Rock and Stone Crushers.

Red oak.
Chestnut.
White oak.
White pine.

Sawmill Parts.

Longleaf pine.
Hickory.
Red oak.
White oak.
Shortleaf pine.

Mining Screens.

Red oak.
Chestnut.

Water Wheels.

White oak.
White pine.
Shortleaf pine.
Poplar.

Table 64.—Wood for Machine Construction Parts, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
White oak,	2,366,100	33.61	\$26 31	\$62,258	2,311,100	55,000
Longleaf pine,	1,431,000	20.33	27 66	39,585	.....	1,431,000
Hickory,	689,000	9.93	27 27	19,063	643,000	56,000
Yellow poplar,	640,800	9.10	42 86	27,463	29,800	611,000
Red oak,	557,500	7.92	27 79	15,491	247,500	310,000
Hemlock,	296,000	4.20	18 22	5,392	296,000	.....
Sugar maple,	288,700	4.10	29 69	8,572	145,700	143,000
Douglas fir,	200,000	2.84	51 25	10,250	.....	200,000
Shortleaf pine,	163,000	2.31	23 99	3,910	10,000	153,000
White pine,	143,500	2.04	41 34	5,932	83,500	60,000
Ash,	83,000	1.18	44 88	3,725	5,000	78,000
Chestnut,	73,000	1.04	35 67	2,601	23,000	50,000
Pitch pine,	49,100	.70	16 44	807	49,100	.....
Loblolly pine,	25,000	.35	32 00	800	.....	25,000
Beech,	11,000	.16	14 55	160	11,000	.....

Table 64—Concluded.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Basswood,	8,500	.12	36 47	310	500	8,000
Birch,	3,000	.01	50 00	75	3,000	.....
Cork elm,	2,000	.03	50 00	100	.....	2,000
Cypress (bald),	150	*	75 00	11	.....	150
Total,	7,040,350	100.00	\$29 33	\$206,508	3,858,200	3,182,150

*Less than 1-100 of 1 per cent.

AGRICULTURAL IMPLEMENTS.

All commodities used by farmers in the preparation of the soil and in gathering and garnering crops are grouped under this industry. The principal uses of the eighteen woods called for are as follows:

Grain Mill Presses.

Sugar maple.
White pine.

Cultivator Parts.

Ash (handles, pole).
Shortleaf pine.
White oak (handles).

Corn Planter Parts.

Basswood.
Yellow poplar.

Corn Sheller Parts.

Beech (frames).
Birch (frames).
Chestnut.
Shortleaf pine (sides).
Sugar maple (boxes, posts).

Eveners.

Hickory.
Red oak.
White oak.

Feed and Ensilage Cutter Parts.

Beech (frame work).
Cypress (boxes).
Shortleaf pine (box sides).
Yellow poplar (sides).

Fertilizer and Lime Distributors.

Cotton gum (boxes).
Longleaf pine (poles).
Red gum.

Hand Rakes.

Hickory (teeth).

Harrows, Spike Tooth.

Red oak.
White oak.

Hay Ladders.

Ash.
White oak.

Hay Presses.

Sugar maple.
White oak.

Horse Pokes.

White elm.

Horse Rake Parts.

White ash.

Land Roller Parts.

Longleaf pine (poles, tops).
Shortleaf pine (tops).
Sugar maple (blocks, tongues, tops).
White oak (frames).

Lawn Mower Handles.

Black ash.
White ash.

Levers, Various Implements.

White ash.

Fertilizer Distributor Parts.

Red gum.

Litter and Straw Carrier Parts.

Sugar maple.
White oak.
Yellow poplar.

Neck Yokes.

Hickory.
White oak.
Beech.

Threshing machines, including grain threshers and clover hullers, are the most important commodities of this industry, and in this particular line of manufacture Pennsylvania leads all other states. There are many interior parts of these machines that require woods of different qualities. The general tendency to substitute metal for wood has not proved practical and consequently a majority of these parts like grain registers, dust conveyors, and screen frames are still made largely of wood. Likely for the same reason, frames and siding or exterior panels of threshers call for wood and white pine and yellow poplar are the principal panel woods because these woods are light, easily worked, take paint readily, and are not given to twist and check.

Straw-carriers, closely allied to threshers, are another product important in this industry in Pennsylvania. Woods similar to those for threshers are demanded; white oak, yellow poplar, and sugar maple in the order named being most frequently called for.

Corn shellers and land rollers demand a considerable amount of lumber each year. Beech for framing, shortleaf pine, and yellow poplar for panels play an important part in making the former, and sugar maple and oak for the latter. The rollers of land rollers were formerly made of wood. A cross-section from a sycamore or yellow poplar log was usually selected and the rollers were usually made on the farm or at nearby blacksmith shops. Today these implements are in universal use and have been found indispensable, as a labor saver. The factories sometime ago began making them and now use metal almost entirely, but a small amount of wood is still in use and hard maple meets the demand in the State. The bottoms of the roller platforms are of shortleaf pine but any strong wood will answer for this purpose. The roller blocks or bearing frames are of hard maple. The hay baler manufacturers also use sugar maple ahead of other woods; but oak, both white and red, is indispensable for certain parts.

Table 65.—Wood for Agricultural Implements, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
White oak,	1,678,700	23.97	\$35.60	\$59,768	887,700	791,000
Red oak,	1,617,000	23.08	32.58	52,680	447,000	1,170,000
Sugar maple,	1,032,600	14.74	28.04	28,952	365,500	667,100
Yellow poplar,	757,500	10.81	34.59	26,205	33,000	724,500
Ash,	599,100	8.55	38.73	23,202	103,100	496,000
Longleaf pine,	563,200	8.04	31.77	17,893	.....	563,200
Chestnut,	140,000	2.00	19.07	2,670	40,000	100,000
Hickory,	124,400	1.78	33.41	4,156	99,400	25,000
White pine,	116,000	1.66	31.71	3,678	26,000	90,000
Shortleaf pine,	95,000	1.36	29.74	2,825	.....	95,000

Table 65—Concluded.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Basswood,	80,000	1.14	31.06	2,485	30,000	50,000
Cork elm,	50,000	.71	25.00	1,250	50,000	.....
Beech,	42,000	.60	22.86	960	32,000	10,000
Cotton gum,	35,000	.50	36.00	1,260	.....	35,000
Cypress (bald),	30,000	.43	35.00	1,050	.....	30,000
Red gum,	24,000	.34	36.00	864	.....	24,000
Birch,	20,000	.29	24.00	480	20,000	.....
Cucumber,	300	*	30.00	9	300	.....
Total,	7,004,800	100.00	\$32.89	\$230,387	2,134,000	4,870,800

*Less than 1-100 of 1 per cent.

TOYS.

The commodities included in this industry and the woods that supplied the material for making them are as follows:

Animals.

Basswood.

Blocks (Toy Wagon).

White pine.

*Boats.*Basswood.
White pine.*Cannon and Fort Sets.*Basswood.
Sweet birch.
Beech.*Chairs (Children's).*Hard maple.
Beech.*Chairs.*

Birch.

*Circus Sets.*Basswood.
White pine.
Yellow poplar.
Sweet birch.
Beech.*Dolls.*

Basswood.

*Furniture.*White pine.
Beech.
Yellow poplar.

Chestnut.

Birch.

Soft maple.

Sugar maple.

White oak.

Red oak.

Elm.

*Games.*White ash.
White oak.
Yellow poplar.
Basswood.*Holders (Christmas Tree).*

Yellow poplar.

Jumpers (Swing).

Red gum.

Pianos (Children's).

Basswood.

*Pastry Sets.*White elm.
Red oak.
White oak.*Play Yards (Baby).*White oak.
Red oak.*Shooting Galleries.*White pine.
Beech.
Sweet birch.
Basswood.

<i>Rockers.</i>	<i>Rocking Horses.</i>
White oak.	White ash.
Red oak.	
<i>Tricycle Seats.</i>	<i>Toy Parts.</i>
Yellow poplar.	Basswood.
Basswood.	Beech.
	Cotton gum.
	Spruce.
	Yellow poplar.
<i>Stick Horses.</i>	Hard maple.
<i>Heads.</i>	Red oak.
White pine.	White oak.
Yellow poplar.	
<i>Sticks.</i>	<i>Wagons and Autos.</i>
Basswood.	White pine.
White pine.	Basswood.
	Yellow poplar.
<i>Wheels.</i>	<i>Tops.</i>
Beech.	Birch.
Sweet birch.	Beech.
	Yellow poplar.
<i>Stocks. Pop Gun.</i>	Chestnut.
Basswood.	Soft maple.
Beech.	Sugar maple.
Sugar maple.	White oak.
	Red oak.
<i>Swings.</i>	<i>Wheelbarrows.</i>
Red oak.	White pine.
Sugar maple.	Basswood.
	Yellow poplar.
<i>Walkers.</i>	<i>Nylophones.</i>
Hard maple.	Sugar maple.
Yellow poplar.	Rosewood.
Red gum.	
Beech.	

Basswood is the principal material for wooden toys and for the wooden parts of metal toys. It is not only demanded in the greatest amount but it enters into the manufacture of more kinds than any other species. It alone supplied the material for the all-wood doll which is made in no other state. This doll is unique, ingenious, and wonderfully useful, in that nearly all parts,—body, arms, legs, hands, feet,—even the head—are made of solid wood. The face is artistically carved and when enameled in lifelike colors and the doll dressed, it is difficult to tell that it is made of wood. The parts of the body are jointed with steel bands having swivel connection, which gives flexibility and freedom of movement. The all-wood doll is made with facial characteristics representative of different nations and of comical characters.

The making of toy pianos is another important division of this industry. Basswood is the prevailing wood again and it goes into all the various parts except the base of large size pianos where a stronger wood is needed, and ash and oak meet this demand. Because it is easily bored and turned to shape, this wood answers first for toy cannons. It is also principally used for wooden animals in menageries and for horse heads and bodies for stick horses.

Though Pennsylvania was sixth in the list of states in the production of basswood lumber, the toy manufacturers reported purchasing 60 per cent. of their requirements from other states. Sugar maple, white pine, and yellow poplar were used not only in almost equal amounts but the average price paid for these woods was also nearly equal. That so much yellow pop-

lar was State-grown is somewhat surprising. In no other industry of this report does wood, State-grown, equal so large a per cent. of the total. Nearly six and a half million feet was required and of this over 85 per cent. is cut in Pennsylvania.

Table 66.—Wood for Toys, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Basswood,	1,404,600	21.86	\$40.80	\$57,286	560,000	844,000
Sugar maple,	762,500	11.87	25.31	19,300	712,500	50,000
White pine,	725,000	11.29	24.90	18,050	487,500	237,500
Yellow poplar,	702,000	10.93	25.48	17,888	659,500	42,500
Beech,	677,400	9.77	18.41	11,553	585,000	42,400
Birch,	617,000	9.61	23.84	14,708	617,000	.....
Chestnut,	500,000	7.79	21.00	10,500	500,000	.....
Red and silver maple,	450,000	7.61	24.00	10,800	450,000	.....
Ash,	320,000	4.98	42.03	13,450	182,500	137,500
White oak,	152,000	2.37	29.26	4,448	132,000	20,000
Red oak,	125,300	1.95	27.17	3,404	100,800	24,500
White elm,	25,000	.39	21.00	525	12,500	12,500
Cotton gum,	5,000	.08	20.00	100	.....	5,000
Red gum,	5,000	.08	25.00	125	5,000	.....
Spruce,	1,300	.02	43.00	56	.....	1,300
Total,	6,421,500	100.00	\$28.37	\$182,193	5,064,300	1,417,200

TRUNKS AND VALISES.

Nine woods make up the four million feet of lumber required yearly in Pennsylvania for making trunks. A number of manufacturers do all the work from the arrival of the rough lumber to the covering, lining, and varnishing of the finished commodity, but others make only the rough boxes in the white, others slats, and others purchase the different parts already manufactured and merely put them together and finish them. The last named class of manufacturers did not make reports for this study because they do not operate wood-working machinery and are merely assemblers. The fact that white elm leads in quantity all other woods listed in the table indicates that in Pennsylvania the slat makers form the most important division of this industry. The quantity demanded, though fairly large, does not equal the amount of ash, which, next to elm, is generally the principal slat wood. Hickory is a frequently used slat wood on sample cases because of its strength but none of the trunk makers reported its use in Pennsylvania; its weight and its high price being against it.

Basswood is the favorite wood for trunk boxes and in Pennsylvania furnished about three-quarters of the material which the manufacturers used. It works easily and holds its shape. The fact that it is fairly strong for its weight qualifies it more than any other factor for this use. Cottonwood is its principal competitor and in the country at large is used in larger quantities. Like basswood it enters largely into veneer and then into built-up lumber from which the better grades of trunk boxes are largely made. Three and four-ply are the thicknesses principally used. Besides being of

lighter weight than ordinary solid trunk box material it is also more substantial and, therefore, in most cases, does not require slat reinforcement. The trunk maker does not buy veneer and make panels. He buys panels already glued together in various thicknesses according to his varied needs. Red gum appears in the table in only small quantities. In other states the demand for it for trunks seems to be increasing and, like cottonwood, is purchased mostly in the form of built-up lumber.

White pine is a favorite wood for trunks made of solid lumber. It is purchased surfaced two sides and edged in thicknesses ranging from $\frac{3}{8}$ inches to $\frac{1}{2}$ inches according to the size and purpose for which the trunk is designed. In quantity the Pennsylvania trunk makers demanded white pine next to basswood. In the country at large loblolly pine is probably called on for solid trunk boxes ahead of any other wood. Lumber from second growth trees is preferred because of the large proportion of sapwood, its freedom from pitch, its light color and light weight. It goes for making the cheaper grades. As little of the wood is visible in the finished product, being covered with leather, cloth, and metal, the figure or color of the wood is not essential.

To save weight, a light wood, cut as thin as the maximum stress will allow, is demanded for trays and inside compartments. Basswood met the largest part of the demand in Pennsylvania while in other states yellow poplar, cotton gum, buckeye, and cottonwood were the species principally employed.

Table 67.—Wood for Trunks and Valises, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
White elm,	1,837,500	44.57	\$30 82	\$56,625	250,000	1,587,500
Basswood,	1,374,500	33.34	27 86	38,209	754,500	620,000
White pine,	428,500	10.39	28 60	12,255	128,500	300,000
Cottonwood,	177,350	4.30	37 95	6,731	.....	177,350
Loblolly pine,	160,000	3.88	24 22	3,875	.....	160,000
Ash,	87,500	2.12	36 42	3,187	87,500	.....
Chestnut,	37,500	.91	25 00	938	17,500	20,000
Red gum,	20,000	.49	35 00	700	.....	20,000
Total,	4,122,850	100.00	\$29 72	\$122,520	1,238,000	2,884,850

BRUSHES.

Pennsylvania surpasses all other states in the production of brush blocks and for their manufacture the factories consume over four million feet of wood annually. Of this material the forests of the state furnished over 93 per cent. of the total, a fact which should appeal to this class of manufacturers when giving consideration to the source of future supply of raw material and what measures are to be taken when the present timber stand is gone. Each kind of the almost multitudinous variety of brushes that are manufactured requires a block of special size and shape, and a wood pos-



Fig. 21.—Oil tank staves preparatory to assembling.



Fig. 22.—Finished oil tank.



Fig. 23.—Manufacture of toy pianos.

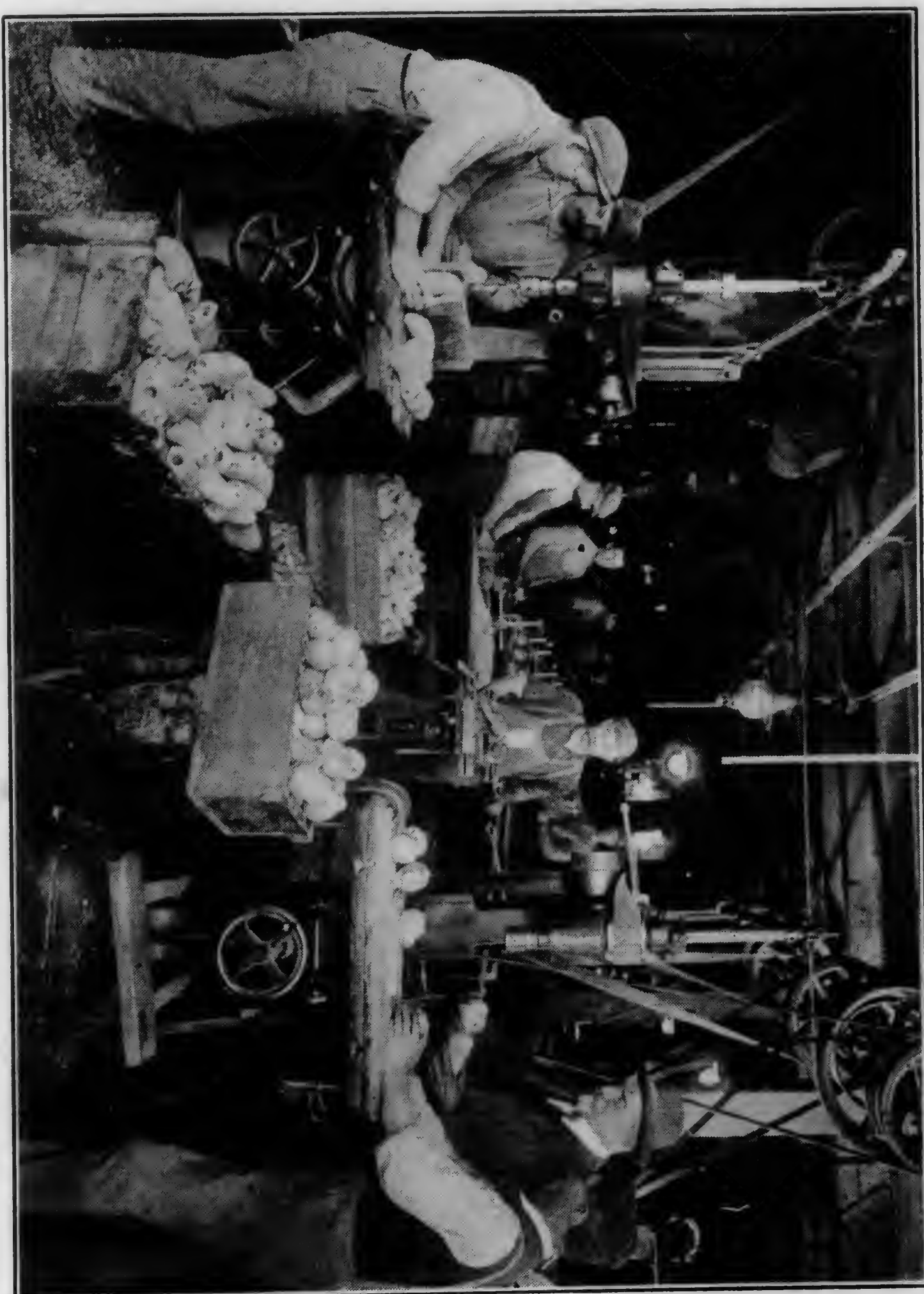


Fig. 24.—Woodworking department of a toy manufacturer. Making wooden dolls.

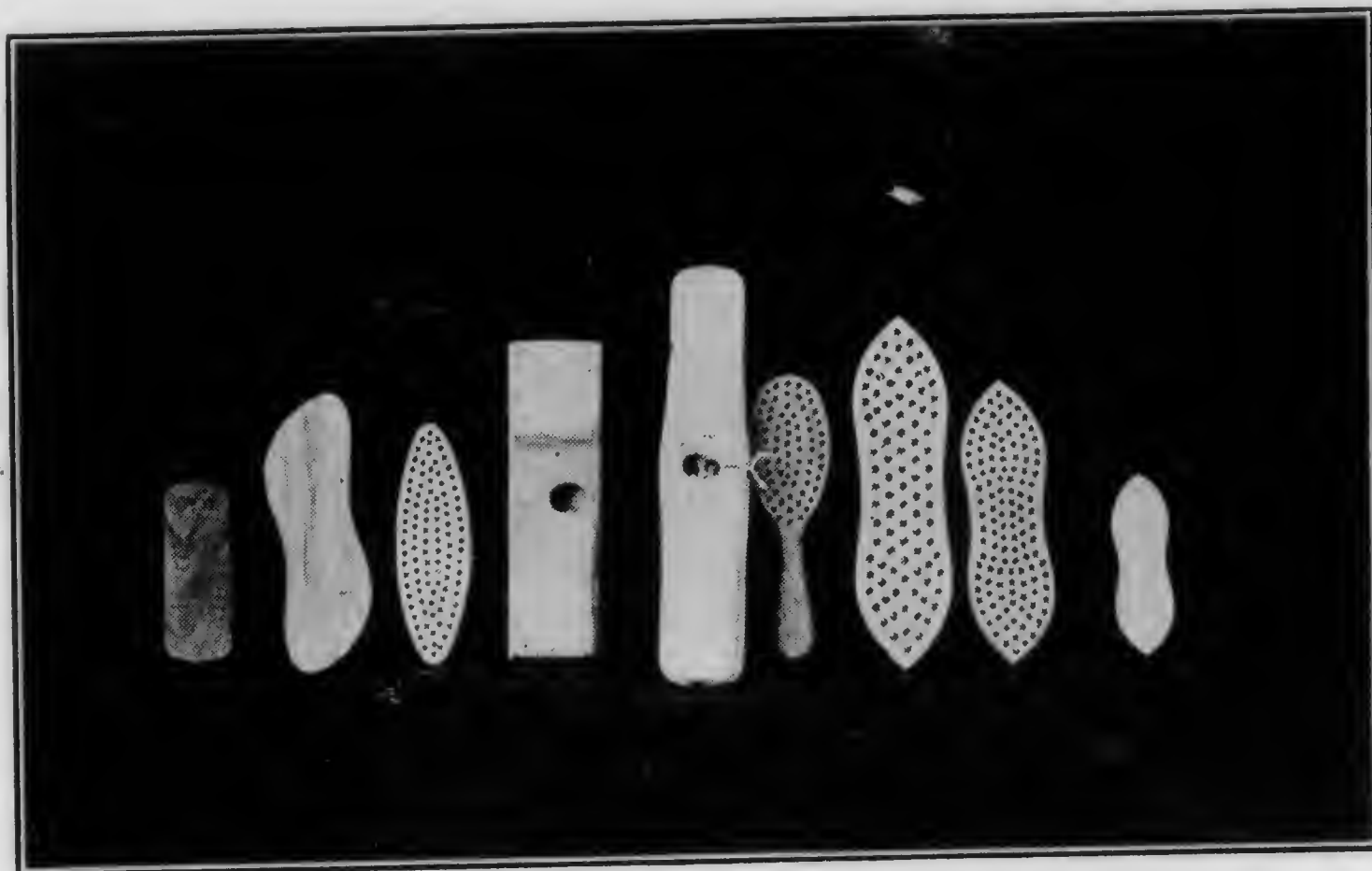


Fig. 25.—Brush Blocks.

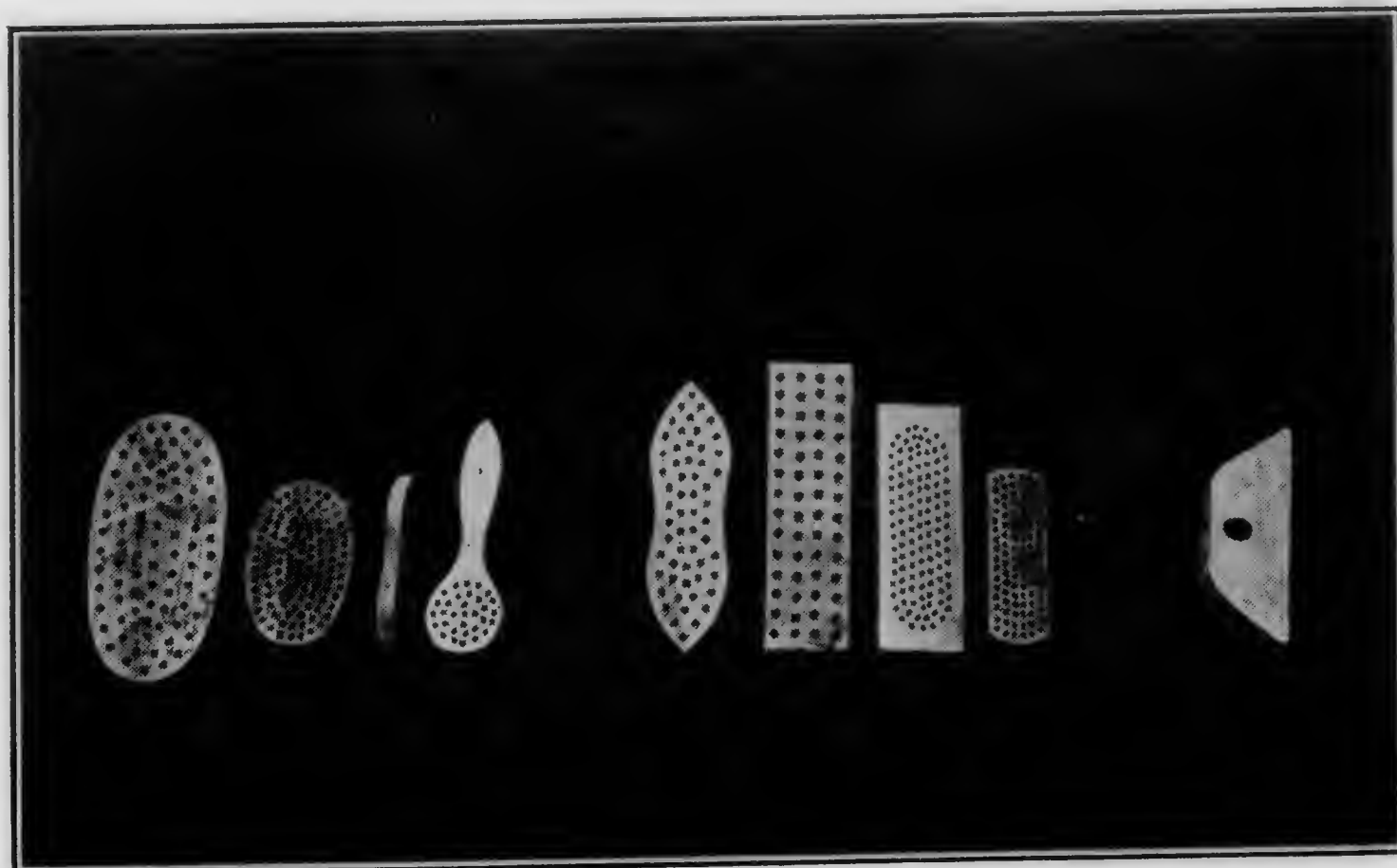


Fig. 26.—Brush Blocks.

sessing qualities adaptable to the special use of the brush. This accounts for the long list shown in the table. There are sixteen woods, and beech constitutes much the largest amount, being equal to almost half of the total. This wood is one of the most plentiful hardwoods growing in Pennsylvania, having properties admirably suited for cheap brushes, and is one of the factors making the industry important in the state. Maple furnishes material for brush blocks considerably more desirable than beech, and, therefore, is in demand for a better grade of brushes. It follows beech in importance as to quantity but of course is higher priced. In no other industry is cherry reported in so large amounts as for brushes. Its low average price as compared to that paid for the same wood by other classes of factories in the State is quite surprising. This industry does not include altogether the production of cheap brush blocks such as are used for making scrubbing, creamery, and brewery, sinks, dust pan, horse, feather dusters, window, stove, carpet, paint, whitewash, and frescoing brushes, and stable and street brooms, but it includes blocks for better grades requiring higher priced woods,—such as red cedar, ash, sycamore, holly, red oak, black walnut, rosewood, boxwood, and other foreign woods. The latter kinds are used for hair brushes, hat, jewelry, clothes, hand, nail, and flesh brushes. The absence of mahogany and ebony from the list of high grade brush woods is hard to explain but none of the manufacturers reported them in this State.

Table 68.—Wood for Brushes, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Beech,	1,931,000	47.83	\$18 87	\$36,430	1,931,000	.....
Sugar maple,	1,066,800	26.43	23 22	24,772	1,066,800	.....
Cherry (black),	482,900	11.96	25 43	12,282	482,900	.....
Yellow poplar,	157,500	3.90	40 68	6,407	32,500	125,000
Red and silver maple,	156,000	3.86	18 96	2,957	136,000	20,000
Sycamore,	71,000	1.76	26 00	1,846	.....	71,000
Birch,	51,000	1.26	14 02	715	51,000	.....
Basswood,	42,300	1.05	34 96	1,479	42,300	.....
Red gum,	37,000	.92	27 00	999	.....	37,000
Red cedar,	23,000	.57	64 57	1,485	5,000	18,000
Ash,	12,600	.31	34 29	432	12,600	.....
Boxwood (West Indian),	3,140	.08	51 91	163	.....	3,140
Holly (American),	1,000	.02	45 00	45	.....	1,000
Black walnut,	1,000	.02	30 00	30	1,000	.....
Red oak,	600	.02	37 00	22	600	.....
Rosewood,	250	.01	300 00	75	.....	250
Total,	4,037,090	100.00	\$22 34	\$90,139	3,761,700	275,390

SHUTTLES, SPOOLS, AND BOBBINS.

The industry making bobbins, spools, shuttles and other loom appliances is in quantity not so large and important in Pennsylvania as in Maine, New York, and New Hampshire; but the fact that these commodities manufactured in Pennsylvania go almost entirely for use in silk mills, and only

a few for woolen and cotton mills, is quite significant. Sugar and soft maple furnished the bobbin and speeder material, and for quills sugar maple and dogwood met the demand, the latter to only a limited extent on account of its higher price. Bobbin material must be hard, tough, close grained, with a texture that smooths easily, and must not rough up in turning.

Paper birch is the species from which small thread spools are manufactured and Maine is the state where most of them are produced. Small spools are turned from a single piece of wood but no factories in Pennsylvania were found making them. The manufacture of large spools, the three-pieced product, used in loom weaving, called for a considerable quantity of lumber. The barrels, sometimes called middles, are made by a process similar to that used in making bobbins and speeders and when in the rough-turned form resemble them except the barrels are uniformly cylindrical. Sugar and soft maple supplied the material for their making in Pennsylvania, but in New England beech and the birches were also used. The heads of these spools, which are cut circular, were entirely of yellow poplar and are screwed on and glued to the barrel, which is threaded at each end.

The most exacting demand for both dogwood and persimmon is for shuttle manufacture. These woods possess a hard dense fiber, wear smooth by use, do not rough up, and besides are heavy and strong. They are the favorite domestic woods for this purpose. Shuttles for silk weaving are made to only a limited extent of these woods. Foreign woods are also called on. Boxwood, both the kind that comes from the Caspian Sea countries and that shipped from the West Indies, was reported, and also small amounts of sarbo and doncella. They are the highest priced woods that are shown in the table. Formerly boxwood furnished nearly all the shuttle material but when its price became prohibitive dogwood took its place and proved a practical and satisfactory substitute. Persimmon has in comparatively recent years become prominent for shuttles, chiefly owing to the insufficient supply of dogwood to meet the entire demand. Shuttles are made from squares cut to the desired size called shuttle blocks and it is in this form that the manufacturers in Pennsylvania purchase their raw material. From the rough block to the finished shuttle there are twenty-two distinct operations.

White oak appears in this industry for making picker sticks and in no other state in which this article was reported was this wood used to any considerable extent. Hickory is the principal picker stick material and in Pennsylvania it supplied almost two-thirds of all wood demanded for this use. Quill boards are made entirely of yellow poplar and loom frames of sugar maple.

Table 69.—Shuttles, Spools, and Bobbins, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Grown Out of Pennsylvania.
Sugar maple,	2,528,000	75.51	\$24 85	\$62,816	1,870,000	658,000
Red and silver maple,	375,000	11.20	26 43	9,910	40,000	335,000
Yellow poplar,	321,000	9.59	36 50	11,715	25,000	296,000
Hickory,	63,000	1.88	46 98	2,960	30,000	33,000
White oak,	35,000	1.05	50 00	1,750	5,000	30,000



Fig. 27.—The manufacture of pipe organs.

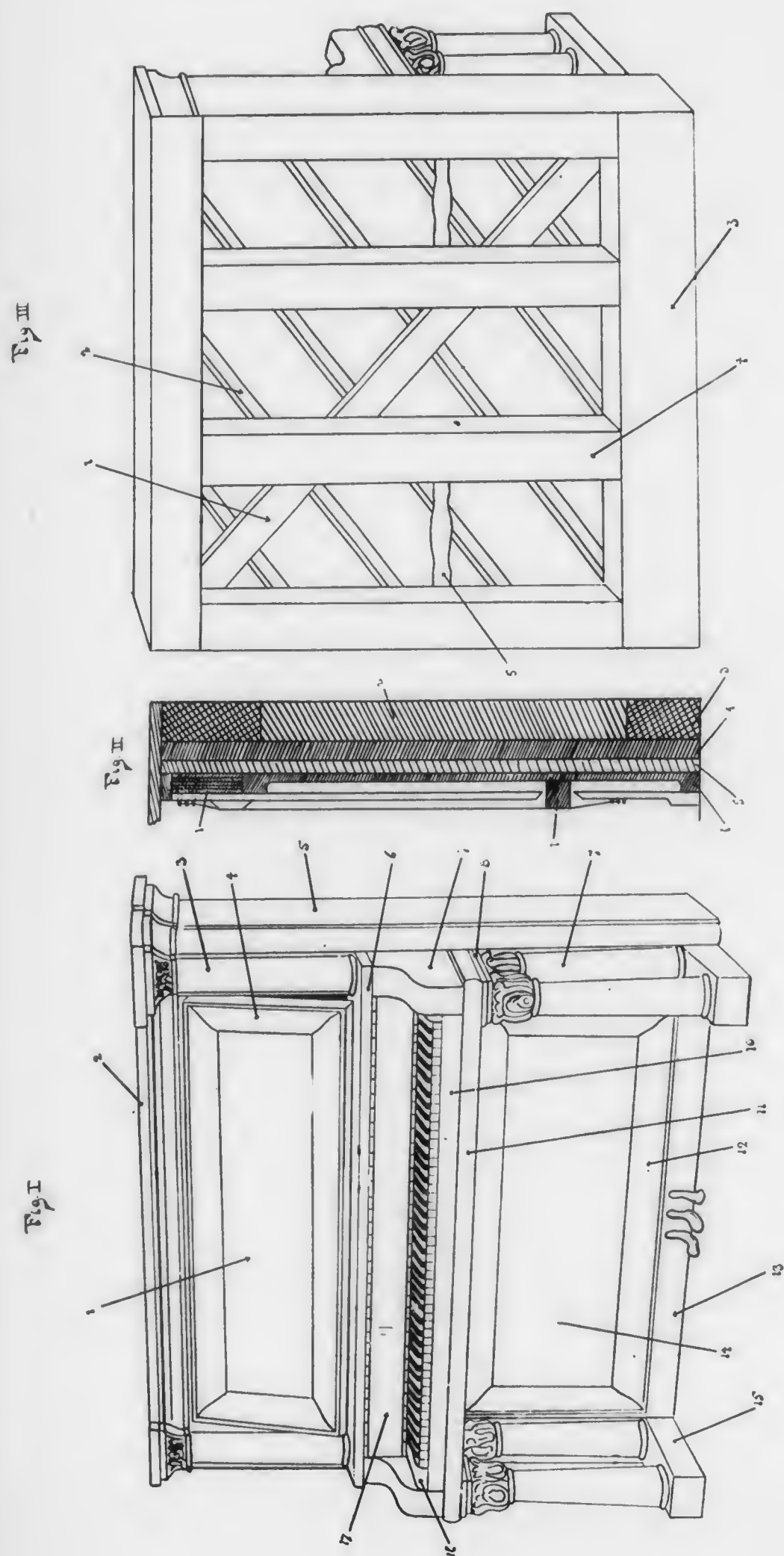


Fig. 28. Piano cases and kinds of wood used in their manufacture.

DESCRIPTION OF FIGURE 28.

UPRIGHT PIANO.

Figure I.

1. Top panel,
2. Top,
3. Pilaster,
4. Moulding,
5. Side,
6. Shelf,
7. Cheek,
8. Moulding,
9. Pilaster,
10. Key slip,
11. Key bottom,
12. Moulding,
13. Pedal board,
14. Bottom panel,
15. Feet,
16. Key block,
17. Fall board,

Figure II.

The cases of the cheaper pianos, as a rule, are made of solid wood, generally sweet birch, beech, or basswood, which is stained to imitate some higher priced wood. The cases of the more expensive instruments, with the exception of the smaller parts, as the moulding, fall boards, pilasters, and key blocks, are always veneered, the veneer being of a fine-finish wood such as mahogany, birds-eye maple, black and Circassian walnut, and rosewood, and from one to three-ply in thickness on a core of some good body wood such as sound wormy chestnut, red oak, yellow poplar, and white pine.

1. Pin blocks: Sugar Maple.
2. Posts: Sugar Maple, White Ash.
3. Back boards: White Ash, Sugar Maple.
4. Diagonal sweep: Spruce.
5. Sounding board ribs: Spruce.
6. Sounding board: Spruce.
7. Bridge: Spruce.

Figure III.

1. Diagonal sweep: Spruce.
2. Sounding board ribs: Spruce.
3. Back board: White Ash, Sugar Maple.
4. Posts: Sugar Maple, White Ash.
5. Handles: Sugar Maple, White Ash.

Figure IV.

1. Key bottom: White Ash, Sugar Maple, Yellow Poplar, White Pine, Mahogany.



- A—Damper felt.
B—Damper head lining felt.
C—Brushing cloth.
D—Action cloth.
E—Action leather.
F—Catcher felt.
G—Hammer top felt.
H—Hammer under felt.
J—Butt felt.
L—Regulating punchings.
T—Hammer rail cloth.
V—Back check felt.
X—Spring rail felt.
Y—Damper lever felt.
Z—Action cloth.
- No.
- 107—Jack (Sugar Maple).
108—Fly flange (Sugar Maple).
109—Wippen (Sugar Maple).
110—Bridle wire.
111—Regulating rail (Sugar Maple, Birch).
112—Regulating rail screw.
114—Back check wire.
115—Jack Spring.
116—Damper spoon.
117—Center rail (Sugar Maple).
118—Flange (Sugar Maple).
119—Damper lever flange (Sugar Maple).
120—Action screw.
121—Butt plate.
122—Damper Spring.
123—Damper lever (Sugar Maple).
124—Damper wire.
125—Hammer butt spring.
126—Spring rail (Sugar Maple).
127—Action screw.
128—Damper block (Sugar Maple).
129—Damper head (Sugar Maple).
130—Abstract (Sugar Maple).
131—Tongue (Sugar Maple).
132—Jack screw, piano head.
133—Key rocker (Sugar Maple).
137—Bridle strap.
154—Back check (Sugar Maple).
155—Key (Sugar Maple).

Table 69—Concluded.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Dogwood,	17,585	.52	69 60	1,224	.....	17,585
Persimmon,	7,010	.21	60 06	421	.....	7,010
Boxwood (West Indian),	1,350	.64	62 96	85	.....	1,350
Sarbo,	30	"	200 00	6	.....	30
Doncella,	10	"	100 00	1	.....	10
Total,	3,347,985	100.00	\$27 14	\$90,888	1,970,000	1,377,985

*Less than 1-100 of 1 per cent.

DAIRYMEN'S AND POULTERERS' SUPPLIES.

The new methods in vogue for carrying on the dairy and creamery as well as the poultry business along scientific lines has brought about the use and manufacture of special equipment among which are included important articles made of wood. The factories manufacturing these articles are the ones that have supplied the data which has been compiled in the table following. They are in no way related and have been combined only for convenience in presenting the statistics since it is considered in this way the uses of the various woods may be more readily discussed. No one factory was found making the entire equipment for all of these above lines of business. They usually specialize either in one particular line or in the manufacture of a single commodity as incubators, butter tubs, egg crates, etc.

Under dairymen's supplies for Pennsylvania are grouped the making of churns, butter tubs, cheese boxes, churn vats, milk bottle washers, and curd grinders. Ash is the principal wood for churns, both for the staves and for the paddles because it retains its shape and is less liable than any other wood to impart taste. This wood is used for making all kinds from the small domestic churns propelled by hand to the large cylindrical churn used in creameries. For the same reason that ash is used for churns it is called for ahead of any other wood for making butter tubs and butter pails. Maple is used with it for bottoms and covers of butter tubs but the quantity is relatively small. In some states experiments have been made with cypress for butter tubs but it was not in use in Pennsylvania although it was reported with ash for churn vats. Over a million and a half feet of wood is required for making cheese boxes. Because white elm has the property of bending it is used for these commodities ahead of any other wood, not only in Pennsylvania, but elsewhere. Other woods are used in fairly large amounts probably more for the reason that they could be purchased cheaper than for any special adaptability. These woods include beech, yellow birch, oak, hemlock, and ash. Wooden parts of the curd grinding machines in cheese factories account for the appearance in the table of cottonwood, ironwood, and a large part of the sugar maple.

The manufacturers of poulterers' supplies required almost as much lumber as the factories making dairymen's equipment. Incubators and brooders were the commodities manufactured. Cypress in the largest amounts answered

with yellow poplar and white pine for incubator cases and also for trays and other inside work. Its stability, affinity for paint and durability are the qualities desired for these uses. The bases and legs of incubators are of red oak and sugar maple, probably selected for strength. Brooder case woods are the same as for incubators except red oak instead of cypress went for frames.

Table 70.--Wood for Dairymen's, Poulterers', and Apiarists' Supplies, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
White elm,	600,000	18.51	\$25 00	\$15,000	250,000	350,000
Cypress (bald),	545,000	16.82	37 02	20,175	.....	545,000
Ash,	400,000	12.34	15 00	6,000	395,000	5,000
Basswood,	370,000	11.42	18 00	6,660	.....	370,000
Yellow poplar,	220,000	6.79	29 82	6,560	.....	220,000
Hemlock,	215,000	6.63	15 49	3,330	215,000	.....
White oak,	205,000	6.33	18 90	3,875	200,000	5,000
Sugar maple,	152,950	4.72	27 96	4,276	23,500	129,450
Shortleaf pine,	145,000	4.48	15 69	2,275	.....	145,000
Beech,	100,000	3.09	16 00	1,600	100,000	.....
Birch,	100,000	3.08	18 00	1,800	100,000	.....
White pine,	79,000	2.44	22 58	1,784	15,000	64,000
Red cedar,	45,000	1.39	55 00	2,475	.....	45,000
Red oak,	36,000	1.11	28 00	1,008	.....	36,000
Red and silver maple,	15,000	.46	10 00	150	15,000	.....
Horsebeam,	10,000	.31	12 00	120	10,000	.....
Cottonwood,	2,500	.08	40 00	100	2,500	.....
Total,	3,240,450	100.00	\$23 82	\$77,188	1,326,000	1,914,450

MUSICAL INSTRUMENTS.

A few manufacturers of this class specialize in building finished piano cases, and in the rough, which are called shells. Others make only the actions and keys. Others not included in this study buy their cases of one manufacturer, their actions of another, their sounding boards of a third, and their hardware from those specializing in that line, and operate merely in assembling the instrument and varnishing and finishing the exterior.

Chestnut which combines sufficient strength with light weight and has a special adaptability for holding glue is favored above all woods for backing veneered cases, and in the quantity consumed leads all other woods reported by the Pennsylvania piano makers and organ builders. It is entirely a case wood for piano cases. That so much of the chestnut reported should have been shipped from other states to the Pennsylvania piano makers is surprising because the chestnut tree is common throughout Pennsylvania, and in the production of chestnut lumber in 1912 Pennsylvania is among the three leading states. Other woods used for veneer backing were red oak, white pine, yellow poplar, and soft maple, because they possess qualities of sufficient strength, are stable in holding their shape, are easily worked, and have a special affinity for glue. The woods used for exterior finish include red oak, white oak, and red gum, Circassian walnut, sweet birch,

mahogany, black walnut, and sugar maple. They are bought to a large extent as veneer because in that form the selection of the most attractive figures is possible. For the backs, posts, and diagonal sweeps, several species—sugar maple, beech, soft maple, yellow birch, and white ash contribute the material because hardness and strength are the properties demanded. The bridges are of spruce, maple, and white ash, because they hold their shape well and are strong. The bottom boards are made of maple, oak, and hemlock, and the pedal boards of sugar and soft maple.

Spruce is the most vibrant wood and therefore foremost for piano sounding boards and sounding board ribs. The red spruce native of the Appalachian and New England regions, and white spruce of the Lake states, have probably been preferred; but since sounding boards are made from wide stock of uniform structure, trees suitable for this purpose are sought over great distances. At present, therefore, sounding board material is shipped from the Northern Pacific Coast states and British Columbia, where Sitka spruce supplies the demand. Sounding board material which shows a number of small annual rings indicating a slow rate of growth is preferred and purchased for high priced pianos. It is usually cut from trees on high altitudes where the development is fairly restricted.

Sugar maple, because it is a hardwood and easy to shape, is most used for actions, although some manufacturers use mahogany and sweet birch for action rails and red cedar and mahogany for hammer moulding and hammer shanks. Sugar maple, owing mostly to its hardness, is used to the exclusion of other woods for pin blocks. Red gum comes in for action parts, and the fact that it has been reported for this use in several other states besides Pennsylvania shows that its qualities have proved it practical for this kind of work.

Piano and organ keys are usually from the upper grades of white pine and sugar maple, but in Pennsylvania basswood also served except for sharps or flats which, like the organ stops, are made of ebony. Ebony was not reported in Pennsylvania nor was any mention made of the manufacture of keys and stops indicating that these commodities are brought into the State ready manufactured. White ash, white pine, sugar maple, yellow poplar, and mahogany furnished the material for the key bottoms because they have little tendency to warp.

Black walnut which is used in larger quantities in this industry than in any other is demanded almost entirely for the outside finish or cases of both pipe and reed organs. White oak, red oak, red gum, cherry, cotton gum, and mahogany also served with it for this use and for consoles and pilasters added only ornamentation. The frames and sills of organ cases were of shortleaf pine, chestnut, hemlock, and red oak, the wind chests and bellows of yellow poplar, basswood, white pine, sugar pine from California, and redwood, while white pine, shortleaf pine and yellow poplar answered for swell boxes. White pine is the principal wood for organ pipes but cherry, sugar pine, and redwood were also reported. Action chests are of a strong wood and red oak supplied most of the material. It is interesting to note that redwood has begun to be used by the eastern manufacturers for interior organ parts. Being fairly strong compared to its light weight, easily worked, free from pitch, and possessing the property of holding its shape well are the reasons why it is held in high favor with the manufacturers and will probably be used more extensively in the future.

Table 71.—Wood for Musical Instruments, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Chestnut,	671,900	22.81	\$24 81	\$16,669	327,000	344,900
Sugar maple,	647,800	22.00	32 20	20,857	225,300	422,500
Spruce,	325,500	11.05	43 24	14,075	.....	325,500
Basswood,	211,500	9.22	42 36	11,500	11,500	260,500
Mahogany,	201,100	6.88	83 11	16,713	.....	201,100
Yellow poplar,	135,100	4.59	70 54	9,530	24,000	111,100
Black walnut,	131,200	4.46	44 05	5,779	67,700	63,500
Red oak,	102,000	3.46	32 25	3,290	50,000	102,000
Birch,	90,000	3.06	23 89	2,150	33,000	40,000
White oak,	88,000	2.99	53 90	4,743	.....	55,000
White pine,	88,000	2.99	34 56	3,041	.....	88,000
Red gum,	50,000	1.70	51 20	2,560	.....	50,000
Red and silver maple,	44,000	1.49	26 82	1,180	.....	44,000
Beech,	20,000	.68	22 00	440	.....	20,000
Cotton gum,	20,000	.68	25 00	500	.....	20,000
Shortleaf pine,	19,900	.67	34 52	687	.....	19,900
Sugar pine,	11,200	.38	87 50	980	.....	11,200
Redwood,	10,000	.34	40 00	400	.....	10,000
Ash,	5,300	.18	44 34	235	5,000	300
Cherry (black),	4,400	.15	75 68	233	3,600	800
Loblolly pine,	3,000	.10	40 00	120	.....	3,000
Hemlock,	2,600	.09	35 00	91	1,600	1,000
Cypress (bald),	2,500	.08	43 60	109	.....	2,500
Total,	2,945,000	100.00	\$39 38	\$115,982	748,200	2,196,800

MACHINERY AND ELECTRICAL APPARATUS.

The wood used in Pennsylvania for making parts of electrical equipment is represented by Table 72. There are fourteen species required, their principal uses being:

Cable Reels.

White pine.
Shortleaf pine.
Hemlock.
Red oak.
Spruce.

Wire Spools.

Sugar maple.
Yellow poplar.
Basswood.
Red oak.

Insulating Pieces.

Sugar maple.

Relay Boxes.

White pine.
Red oak.

Switch Boards.

Mahogany.

Wire Reels.

Hemlock.
White pine.
Red oak.
Yellow poplar.
Spruce.

Electrical Cabinets and Cases.

White ash.
Walnut.
Red oak.
Sugar maple.
Mahogany.
Longleaf pine.

Trunking.

Shortleaf pine.
White pine.

Switch Signal Blades.

White pine.
White ash.
Sugar maple.

The largest amount and greatest number of woods of this industry go into cable and wire reels and spools for small size insulated wire. It will be noted that the softwood or conifers not plentiful in Pennsylvania are preferred in their manufacture which probably accounts for so great a percentage of the material being shipped in from other states. Hemlock and black walnut were the only woods listed as wholly home-grown. Pennsylvania wire manufacturers use a much larger number of wood reels than is indicated in this table but because they are manufactured elsewhere and brought to the State ready for use after being assembled merely, information concerning this material was not asked for. It had previously been accredited to the state where the reels were actually manufactured.

Table 72.—Wood for Machinery and Electrical Apparatus, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Shortleaf pine,	968,200	35.66	\$21 89	\$21,191	.....	968,200
White pine,	787,200	28.99	46 02	31,504	150,000	637,200
Sugar maple,	558,500	20.57	34 85	19,465	150,000	408,500
Hemlock,	143,600	5.29	26 85	3,856	143,600	.....
Spruce,	87,700	3.23	26 00	2,280	.....	87,700
White oak,	80,000	2.95	28 38	2,270	10,000	70,000
Red oak,	43,500	1.60	41 72	1,815	.....	43,500
Ash,	25,000	.92	60 00	1,500	.....	25,000
Yellow poplar,	10,000	.37	55 60	556	.....	10,000
Mahogany,	6,000	.22	100 00	960	.....	6,000
Black walnut,	2,500	.09	40 00	100	2,500	.....
Basswood,	2,000	.07	55 60	111	.....	2,000
Longleaf pine,	1,600	.04	25 00	25	.....	1,000
Total,	2,775,200	100.00	\$31 54	\$85,633	456,100	2,259,100

WATER PIPES AND PUMPS.

Over two and one-half million feet of lumber is demanded annually in Pennsylvania for making wooden water pipes and wood linings for iron water pipes. In coal mining operations the chemical action of the water that collects there holds in solution various minerals, chiefly sulphur, that have a deleterious effect upon iron. Pipes employed for conducting this water away, when of iron, are usually lined with wood to prevent corrosion or, as in many cases, are made entirely of wood. White pine is demanded in the largest quantities for both of these purposes. The average price indicates that the lower grades were employed, as were the sugar maple, beech, and sweet birch and other species were used. Most of the white pine reported was State-grown, which is another instance of an industry at present depending on the forest resources of the State. Yellow poplar, the most expensive wood, came from a distance and went entirely into liquor logs, both for well and boat pumps, the latter used principally on boats for transporting ore coal and other heavy freight. In other states, according

to quantity, cucumber is preferred for liquor logs but unless it was mixed with yellow poplar, as is frequently done in marketing this wood, none was used in Pennsylvania.

Table 73.—Wood for Pumps, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
White pine,	2,092,000	77.71	\$24 59	\$51,435	1,575,000	517,000
Sugar maple,	400,000	14.86	17 00	6,800	400,000	.....
Yellow poplar,	100,000	3.71	45 00	4,500	.....	100,000
Birch,	50,000	1.86	17 00	850	50,000	.....
Beech,	50,000	1.86	15 00	750	50,000	.....
Total,	2,692,000	100.00	\$23 90	\$64,335	2,075,000	617,000

BASKETS AND VENEER PACKAGES.

The products of this industry are made exclusively of veneer cut from close grained non-resinous woods with the tops and bottoms of thicker material—thin lumber,—which is often sawed from the cores (that part of the log after the veneer has been removed), or from low grades of lumber. Formerly splint baskets were the kinds used. There is a wide difference between split wood and woods suitable for veneers. The former require straight grained woods, easily rived. The sapwood of white oak, basket oak, cow oak, ash, and hickory were among those frequently used. After the introduction of rotary veneer machines they began to make them, as they are doing in Pennsylvania, from veneer cut into wide strips and woven; and cheaper woods, usually with close compact cross grain without much resin, have taken the place of the splint woods. For stave baskets a great deal of the veneer is cut into staves varying in length from 12 inches to 18 inches. The bottom is of solid edged lumber, to which the narrow ends of the staves are tacked. The staves are held in place at the top and added strength is given at the bottom by the use of thin cut rims of white elm, beech, and soft maple. These baskets are made in many sizes and have a bent handle which is often of beech, hard maple, and white elm. Various woods answer for the veneer part of the stave baskets; the principal ones reported by Pennsylvania manufacturers are beech, soft maple, elm, ash, birch, and black gum.

Other commodities made by this industry include packages used in marketing fruits and vegetables such as tills, hoppers, vendors' trays, and the like. This industry in Pennsylvania used a comparatively small amount of wood compared with the amounts used in Delaware, Maryland, Virginia, and North Carolina. The number of firms specializing in this line as well as in basket making justifies the grouping of the information concerning this line of manufacture into a separate industry instead of including it with the material going into boxes and crates, as has been the case in a number of other state reports where the veneer package industry is relatively unimportant.

Table 74.—Wood for Baskets and Veneer Packages, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Beech,	1,079,000	40.22	\$13 62	\$20,093	949,000	130,000
Sugar maple,	549,000	20.46	18 15	9,963	549,000	.....
White pine,	230,000	8.57	21 00	4,830	230,000	.....
Basswood,	220,000	8.20	20 18	4,440	220,000	.....
Red and silver maple,	145,000	5.40	20 00	2,900	.....	145,000
Red oak,	125,000	4.66	23 00	2,875	125,000	.....
White elm,	115,000	4.29	21 87	2,515	115,000	.....
Chestnut,	100,000	3.73	19 00	1,900	100,000	.....
Birch,	70,000	2.61	22 43	1,570	70,000	.....
Ash,	30,000	1.12	21 00	630	30,000	.....
Black gum,	20,000	.74	22 00	440	20,000	.....
Total,	2,683,000	100.00	\$19 44	\$52,156	2,408,000	275,000

FRAMES AND MOULDINGS.

Woods used in Pennsylvania for picture frame mouldings—plain, enameled, embossed, and carved,—electric wire moulding, and frames for school slates and blackboards, are listed in Table 75. This industry excludes all mouldings employed in the interior finish of houses except those which are put in place by the paper hangers for drop ceiling work and for picture hanging. Furniture, casket, and fixture moulding are grouped with the material respectively for the industries making these commodities.

Twenty-one woods are called on for the manufacture of the commodities mentioned above and scarcely one-fourth of the total quantity was cut from trees that grow within the State. Basswood is the principal material used, exceeding three times the total of all others. It went principally for fancy finish such as gilt, enamel, and embossed mouldings. Basswood not only holds paint well but keeps its shape and is easy to work and to cut, nail, and fit to place. Yellow poplar met part of the demand but was consumed in relatively small quantities. Frames displaying the figure of the wood are usually the highest priced moulding. Mahogany, white oak, black walnut, ash, and chestnut are called on by the Pennsylvania manufacturers for these lines of work if they are finished in oil or wax to bring out the natural beauty of the wood or else are darkened by stains or ammonia fumes for mission effects. Red gum is an important wood in this industry. It stood third in a similar table in Illinois, second in Michigan, and fourth in New York. It answers with sweet birch for the imitation of expensive woods.

Considerably over half a million feet of lumber each year is demanded in Pennsylvania for mouldings to conceal and protect electric wiring on walls and ceilings. Shortleaf pine and red oak were used in small quantities, but basswood met practically all the demand. Slate frames, except those covered with cloth, were entirely of beech. Basswood answered for the felt-bound ones and together with spruce supplied the material for blackboard frames.

Table 75.—Wood for Frames and Mouldings, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Beech,	1,200,000	45.82	\$20 08	\$24,100	600,000	600,000
Basswood,	902,000	34.44	23 09	20,825	352,000	550,000
White oak,	107,000	4.69	55 46	5,934	27,000	80,000
Spruce,	100,000	3.82	30 00	3,000	.....	100,000
Chestnut,	93,000	3.55	22 41	2,084	25,000	68,000
Yellow poplar,	87,000	3.32	38 51	3,350	.....	87,000
Red gum,	50,000	1.91	30 00	1,500	.....	50,000
Sugar maple,	20,000	.76	22 50	450	20,000	.....
Mahogany,	15,000	.57	120 00	1,800	.....	15,000
Red oak,	12,000	.46	44 00	528	2,000	10,000
Black walnut,	10,500	.40	80 67	847	4,500	6,000
Ash,	10,000	.38	35 00	350	10,000	.....
Birch,	7,500	.29	75 00	562	.....	7,500
Shortleaf pine,	5,000	.19	30 00	150	.....	5,000
Total,	2,619,000	100.00	\$25 60	\$65,480	1,040,500	1,578,500

REFRIGERATORS AND KITCHEN CABINETS.

Table 76 lists the woods used in Pennsylvania in the manufacture of refrigerators, kitchen cabinets, and cupboards. The combination cabinets and cupboards have become almost indispensable to housekeepers in that they provide a convenient place for all the accessories to cooking that are necessary to be kept at hand. In late years they have become popular and factories making them specialize in this line. Because they are sold at low prices they are not usually made of the upper grades of lumber that are employed in the manufacture of furniture. Yellow poplar and oak, both red and white, and to a limited extent birch, are the woods mainly used in Pennsylvania for the case or outside work. The interior parts, such as shelving, compartment partitions, drawer sides and bottoms, etc., are made of yellow poplar, spruce, cottonwood, maple and beech. The backs of these cases are also made of low grade material and none of special quality or kind was demanded. Almost any cheap species, easily worked, will answer. In consequence, a proportion of nearly all listed in the table served for this use. Shortleaf pine, spruce, and white oak were reported for framing.

Refrigerators run from what are practically small ice boxes to large sectional cases the size of a room used by butchers and others doing business requiring cold storage equipment. Refrigerators and chests for domestic purposes call for soft woods of conifers for linings. The reason for this is that many hardwoods have an odor and therefore are unfit for a storage compartment of perishable foodstuffs. Spruce is the principal lining material in Pennsylvania, and was also employed for ice pan supports. Cypress in some states is used for this purpose and in others white and yellow pine is used. The siding or outer case is usually hardwood,—white oak, white ash, red oak, birch, cherry, and red gum. They are selected as being not only best for the work intended, but the exterior properly finished gives the chest the appearance of an article of furniture. The case is not attached

to the lining, since between the lining and the case there is provided an insulation space, which in some refrigerators is filled with materials like sawdust, cork, and charcoal, and in other refrigerators the space is left unfilled, the dead air being regarded the most effective insulation. Lumber for refrigerators must be well dried as otherwise the extreme variations of temperature are apt to cause it to buckle and check. The large refrigerators or cooling rooms are built to order in the place in which they are used. Though hardwoods are called on for the exterior or case work of the higher priced work, softwoods answer to a considerable extent both for the linings and cases. The materials for both of these parts are usually rather thick and are preferred to guard more effectively against the penetration of heat. It is possible, so the Pennsylvania manufacturers claim, to secure a temperature of 38 degrees from ice alone in these large refrigerators.

Table 76.—Wood for Refrigerators and Kitchen Cabinets, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Yellow poplar,	566,200	22.98	\$28 27	\$16,009	363,000	203,200
Shortleaf pine,	453,750	18.42	27 07	12,284	.....	453,750
White oak,	448,450	18.26	30 44	13,649	250,000	198,450
Spruce,	413,800	16.79	37 39	15,474	190,000	223,800
Cottonwood,	150,000	6.09	32 00	4,800	.....	150,000
Red oak,	117,450	4.77	41 91	4,922	.....	117,450
Sugar maple,	80,750	3.28	28 71	2,318	30,750	.....
Birch,	65,000	2.64	25 15	1,635	30,000	35,000
Beech,	55,000	2.23	17 36	955	30,000	25,000
Hemlock,	37,100	1.50	22 13	821	33,100	4,000
Ash,	32,000	1.30	38 19	1,222	4,000	28,000
Basswood,	21,600	.88	31 11	672	1,600	20,000
Chestnut,	11,800	.48	28 06	331	11,800	.....
Cherry (black),	7,500	.30	62 50	469	7,500	.....
Red gum,	2,900	.12	50 60	145	.....	2,900
White pine,	500	.02	28 00	14	500	.....
Total,	2,463,800	100.00	\$30 73	\$75,720	1,002,250	1,461,550

EXCELSIOR.

Formerly excelsior was called wood fiber but later it received its present name given it by an upholstery firm in its advertisement. In 1860 this commodity was first placed on the market by a Maine manufacturer, but it was not called on to meet much of a demand for a decade; then with the improved machinery invented by Europeans the manufacture of excelsior was greatly facilitated. Since that time it has become a staple product. According to a recent report by the Forest Service and the Bureau of the Census, it was ascertained that 85,000,000 feet of forest material is yearly demanded for its manufacture. Pennsylvania is not so important an excelsior state as either Virginia or New York, the former being second and the latter third. Pennsylvania is the tenth, consuming each year over one and a half million feet of wood all cut within the State. In the New England

and Lake states, aspen or popple, basswood and willow are used; in Virginia and North Carolina, scrub and loblolly pine, yellow poplar, and white pine meet the demand. In the Mississippi Valley states excelsior makers report the use of cottonwood, yellow poplar and yellow pine, and in the Pacific coast states black cottonwood alone furnishes all of the demand. For the United States, in quantity, aspen is the favorite excelsior wood, yellow pine next. Pennsylvania manufacturers prefer basswood and yellow poplar next. These woods with aspen make the best grades of excelsior. The consumption of yellow poplar in this line of manufacture is greater in Pennsylvania than in any other state, though it is used in eight others. Butternut appears in only one other state, New Jersey, and, next to Michigan, beech finds its greatest demand in Pennsylvania for excelsior. Chestnut excelsior is solely a product of Pennsylvania and until this investigation, the Forest Service had received no record of the use of this wood for this purpose. Excelsior wood should be straight grained, soft, dense, light in weight and color, moderately non-brittle, stiff when dry, and odorless.

The raw material used for making excelsior comes in the form of bolts and split billets, usually in lengths the multiples of 18 inches. The wood is thoroughly seasoned before manufacturing but if seasoned too long it becomes brittle and often is injured by certain forms of incipient decay. The billets are set in the excelsior machines and without further handling are shaved into the finished product. The output of an eight block machine varies from 6,000 to 10,000 pounds per day according to the fineness of the product. From the cutting machines the excelsior is taken to the baling room where presses, similar in operation to hay balers, put it into marketable form.

The first use of excelsior was for packing wares liable to injury in transportation, but later it proved valuable for filling cheap mattresses and upholstered furniture. In France not only does excelsior answer for this purpose, but highly improved machinery has made it possible to manufacture a product of such fine grade as to be a fit substitute for the absorbent lint used in hospital, or filtration purposes, and for weaving into floor coverings. Various grades of excelsior are frequently dyed without losing their elasticity. They serve as an ornamental packing material, and for color schemes in displaying goods in show cases, but none was reported in Pennsylvania. Table 77 gives the available statistics.

Table 77.—Wood for Excelsior, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Basswood,	749,000	44.53	\$13 77	\$10,315	749,000	.....
Yellow poplar,	638,000	40.90	15 00	10,030	638,000	.....
Beech,	116,500	6.93	15 00	1,748	116,500	.....
White pine,	63,500	3.78	15 00	953	63,500	.....
Butternut,	30,000	1.78	15 00	450	30,000	.....
Aspen (popple),	30,000	1.78	15 00	450	30,000	.....
Chestnut,	5,000	.30	14 00	70	5,000	.....
Total,	1,682,000	100.00	\$14 28	\$24,016	1,682,000	.....

PLAYGROUND EQUIPMENT.

Under this industry are listed the woods used for making apparatus or wooden parts thereof that contribute equipment for public parks and playgrounds. Swings, merry-go-rounds, coasting boards, ferris wheels, croquet sets, see-saws, shoot-the-chutes, etc., are examples of the principal ones. Swings, however, were the only commodities manufactured in Pennsylvania. The total of the following table, 1,507,300 feet, represents the amount of material that is required each year for their manufacture. Not all of this material went into playground swings since swings of every description are included and some required more lumber for making than others. According to quantity consumed, lawn and porch swings are the most important. The latter answer not only for amusement but are also useful as furniture,—a suspended settee for porch appointments. Of late this commodity has grown rapidly in favor.

Nine woods are listed in Table 78, and those species best suited for swing material, i. e., those possessing the necessary inherent qualities of strength, hardness, and durability when exposed are the ones included. The oaks, beech, and ashes in the order named, were the most prominent hardwoods. The chief conifers used were longleaf, shortleaf, and loblolly pine, the last named being used in the largest quantities. The pines answered mostly for lawn swings and principally for the staffs and the frame work or superstructure.

Table 78.—Wood for Playground Equipment, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Red oak,	456,300	30.27	\$32 23	\$14,707	216,300	240,000
Loblolly pine,	400,000	26.54	20 00	8,000	.....	400,000
Shortleaf pine,	240,000	15.92	27 00	6,480	.....	240,000
White oak,	151,000	10.02	37 95	5,730	98,500	52,500
Beech,	130,000	8.62	29 46	3,830	130,000	.....
Ash,	75,000	4.98	33 00	2,475	37,500	37,500
Yellow poplar,	25,000	1.66	36 00	900	12,500	12,500
Sugar maple,	23,000	1.53	26 96	620	3,000	20,000
Longleaf pine,	7,000	.46	52 00	364	.....	7,000
Total,	1,507,300	100.00	\$28 60	\$43,106	497,800	1,009,500

PRINTING MATERIAL.

Electrotype backing, woodcut engravings, and wood type are the only products listed under this head. Four woods were demanded for their making. Cherry heads the list as to quantity and went entirely into electrotype mountings, which is probably the most exacting use it has. Because it is less liable to warp than any other American woods that possess the other requisite qualities for this use is the reason the electrotypers demand cherry exclusively. Its strength and density, its resistance to splitting, and its property to work smoothly are other important qualities which com-

mend it. Electrotpe backing is not made, as formerly, entirely from solid lumber. Glue is to a large extent called on to put together narrow strips or thin layers for built-up mountings that are beginning to be used extensively. The growing scarcity of cherry, together with the rapidly increasing demand for this line of work requires the electrotypers to pay a price over twice as great as that asked five years ago.

For wood engravings, boxwood from Turkey and Russia was the only wood reported and in other states as well it met most of the demand, especially for high grade work. It is the most expensive wood that is listed in any industry. The price, \$1,300 per thousand feet, is little, if any, above the usual cost of this wood for engravings and it is usually sold in terms of cubic inches, four cents being the average reported in Philadelphia. Owing to the high cost of this wood, engravers employ domestic substitutes to a large extent, but they are for the cheaper grades of work. Sugar maple, apple, and pearwood are the kinds most used.

Metal has almost entirely replaced wood for printer's type. Wood is still called for to a limited extent, chiefly for manufacturing large size type such as is used for printing billboard advertisements. Formerly boxwood furnished the material, but its high cost now stands in the way and sugar maple, which was the only wood reported in Pennsylvania, now furnishes most of the supply.

Table 79.—Wood for Printing Material, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Grown Out of Pennsylvania.
Cherry (black),	1,166,800	91.56	\$29 14	\$34,003	634,000	532,800
Birch,	30,000	2.36	50 00	1,500	10,000	20,000
Red and silver maple,	25,000	1.96	31 60	790	20,000	5,000
Mahogany,	23,500	1.84	85 96	2,020	.....	23,500
Redwood,	20,000	1.57	63 00	1,260	.....	20,000
Yellow poplar,	5,000	.39	18 00	90	.....	5,000
Beech,	2,000	.16	30 00	60	2,000	.....
Applewood,	1,000	.08	50 00	50	1,000	.....
Sugar maple,	500	.04	80 00	40	500	.....
Hickory,	500	.04	50 00	25	500	.....
Boxwood (Turkish),	26	*	576 92	15	.....	26
Total,	1,274,326	100.00	\$31 27	\$39,853	668,000	606,326

*Less than 1-100 of 1 per cent.

LADDERS.

Nine manufacturers reported the making of ladders, including step ladders, travelling store ladders, firemen's ladders, and extension ladders used by painters and other mechanics. In other state reports ladders have been classified under woodenware but owing to the number of concerns in Pennsylvania specializing in making them and because of the large quantity of wood which they annually consume, their presentation under a separate heading is justified.

Loblolly pine and basswood supplied the largest part of the demand and were called on mostly for step ladders because being strong and at the same time light in weight they are well adapted for this line of use. Beech was used extensively for steps because of its strength, and in order not to make the ladders too heavy, it was used with a lighter wood for styles. Other step ladder woods were cypress, longleaf pine, and spruce. The staffs, which are the hinged supports, are made of various woods and usually of the same kind as the styles except those of considerable length where extra strength is desired. In order not to add too much weight staffs are made of strips of small dimension and to meet the stress imposed are well braced and made from material free from imperfections. For extension and firemen's ladders high grades are used. Spruce is most in demand for the styles or uprights while for the ladder rungs, hickory, ash, beech, and maple were employed in the order mentioned.

Travelling ladders are so named because they are readily moved by the occupant without descending. They are used in stores. Pulleys, movable on a track, are attached at the top, and in some designs the bottoms rest on castors. Lightness of weight is not a consideration in these as in step ladders and thicker materials and heavier woods are therefore used. Longleaf pine was used mostly but sugar maple, loblolly, and shortleaf pine also met a part of the demand.

Sixty-five per cent. of the ladder woods were kinds that do not grow plentifully and some not at all in Pennsylvania. This accounts for only 20 per cent. of the requirements of this industry being met by the forests of the State. Of the kinds reported common to Pennsylvania, the entire amounts consumed were home-grown except basswood, nearly one-half of which was brought in from forests of other states.

Table 80.—Wood for Ladders, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Grown Out of Pennsylvania.
Loblolly pine,	400,000	36.08	\$20 00	\$8,000	.....	400,000
Basswood,	275,000	24.81	29 18	8,035	150,000	125,000
Spruce,	191,000	17.23	43 40	8,290	.....	191,000
Cypress (bald),	62,500	5.64	54 64	3,415	.....	62,500
Longleaf pine,	50,000	4.51	38 00	1,900	.....	50,000
Sugar maple,	50,000	4.51	27 00	1,350	50,000	.....
Hickory,	25,000	2.26	18 00	450	25,000	.....
Shortleaf pine,	25,000	2.26	25 00	625	.....	25,000
Beech,	22,000	1.98	18 27	402	22,000	.....
Ash,	4,000	.36	70 00	280	4,000	.....
Yellow poplar,	4,000	.36	21 00	84	.....	4,000
Total,	1,108,500	100.00	\$29 16	\$32,321	251,000	857,500

ELEVATORS.

Fifteen manufacturers reported using wood for the manufacture and repair of freight and passenger elevators, both hand power and traction, lifts, dumb waiters, etc., and many of them are important industries maintaining formidable establishments. In the production of the finished commodity they give Pennsylvania a high standing among the states but in consumption of lumber they report the use of only a little over a million feet, annually, making this industry 35th in the list or 17th from the last. Not many years ago lumber was the most essential material the elevator manufacturers used but generally steel construction began to take the place of wood and proved to be such a practical and desirable substitute that now for power elevators, especially passenger, wood is employed only incidentally for a few minor parts. The sight of the old time wooden passenger elevator car today is an exception, but on the other hand many small freight elevators and dumb waiters are made entirely of wood, the initial cost being much lower than steel. Some are made that are part steel and part wood. The rough lumber demanded for elevator construction is shown in Table 81. Eleven kinds were reported and their principal uses are as follows:

PASSENGER ELEVATORS.

Car Platforms.
Sugar maple.

Overhead Machine Platform.
Sugar maple.

FREIGHT ELEVATORS.

Guide Posts.
White pine.
Longleaf pine.
Norway pine.

Panel Sides.
Longleaf pine.
Loblolly pine.
White oak.
Sugar maple.

Guide Strips.
Sugar maple.
White ash.

Overhead Beams.
Sugar maple.
Longleaf pine.
Loblolly pine.
White ash.

Upper Frames.
Sugar maple.
Longleaf pine.
White ash.

Car Beams.
Sugar maple.
White elm.
White oak.
Norway pine.

Enclosures.
Longleaf pine.
White pine.
Loblolly pine.

Weight jams.
Longleaf pine.
Sugar maple.
White elm.

Gates.
White oak.
Loblolly pine.

Car Platforms.
Sugar maple.
Cypress.
Longleaf pine.

Footing Pieces.
Longleaf pine.
Norway pine.
Sugar maple.
Cork elm.

DUMB WAITERS.

Car Frames.
Spruce.
Cork elm.
Longleaf pine.
Sugar maple.

Shaft Lining.
White oak.
Hemlock.
Chestnut.
Loblolly pine.

Car Finish.
Yellow poplar.
Loblolly pine.
White pine.

Weight Jams.
Yellow poplar.
White pine.
Cork elm.

Guide Posts.
Yellow poplar.
White pine.

Weight Boxing.
Loblolly pine.
Yellow poplar.
White pine.

Guide Strips.
White ash.
Sugar maple.

This industry does not depend on the forests of the State to any great extent as a source of raw material. Less than one-quarter of the total was grown in Pennsylvania because the lumber chiefly used in elevator construction is of kinds that are rarely, if at all, cut in Pennsylvania. Longleaf, Norway or red, loblolly, and shortleaf pine, and cypress together constitute over 52 per cent. of the total. Sugar maple and ash were the principal home-grown woods demanded and from the average prices recorded the upper grades were principally purchased. The available statistics are:

Table 81.—Wood for Elevators, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Longleaf pine,	269,900	26.75	\$36 73	\$9,913	.....	269,900
Sugar maple,	141,200	14.00	49 74	7,023	81,200	60,000
Norway pine,	100,000	9.91	28 00	2,800	.....	100,000
Loblolly pine,	96,500	9.56	32 31	3,118	.....	96,500
Ash,	93,000	9.22	71 17	6,619	43,600	49,400
Yellow poplar,	82,600	8.19	41 88	3,459	30,600	52,000
White pine,	62,200	6.16	40 45	2,516	32,200	30,000
White oak,	53,200	5.27	48 03	2,555	23,200	30,000
Shortleaf pine,	50,000	4.96	22 00	1,100	.....	50,000
Cork elm,	20,500	2.03	65 00	1,332	20,500	.....
White elm,	12,000	1.19	65 00	780	.....	12,000
Cypress (bald),	10,000	.99	55 00	550	.....	10,000
Spruce,	10,000	.99	30 00	300	10,000	.....
Chestnut,	4,000	.40	70 00	280	.....	4,000
Hemlock,	3,800	.38	30 00	114	3,800	.....
Total,	1,008,900	100.00	\$42 08	\$42,459	245,100	763,800

CANES AND WHIPS.

The variety of woods used for canes, umbrella and parasol handles exceeds that reported by any other industry in Pennsylvania. Table 82 includes 72 species of wood. Because the raw material for these commodities is most usually purchased in billet, pole or twig form, and very frequently by the piece, it was impractical to reduce the amount of the material reported to board feet except in a few cases when certain woods were used in comparatively large quantities. The total of Table 82 does not, therefore, represent the entire amount of wood that is used for manufacturing these

products in Pennsylvania, but in order that the remarkable number of different kinds of wood,—many of which have not been reported in any other state report,—may be presented, they have been listed in the table without accompanying statistics. Most of them are high priced and a majority are foreign woods. As many as were readily available will be found included in the preceding illustration. A large per cent. of all the sugar maple and soft maple shown in the table went for dowels or shanks of umbrellas and parasols, while the entire amount of beech answered for whip stocks and handles. Reed cut in large quantities from rattan shipped from the Orient was also used for whips but it was reported in pounds and could not be reduced to feet to be included in the table.

Table 82.—Wood for Whips, Canes, and Umbrella Sticks, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Beech,	266,500	30.18	\$21 91	\$5,838	252,000	14,500
Sugar maple,	241,100	27.31	17 57	4,237	241,100	.....
Gibony,	124,150	14.06	187 94	23,333	.....	124,150
Red and silver maple,	107,000	12.12	26 45	2,830	2,000	105,000
Congo,	60,000	6.80	133 00	8,000	.....	60,000
Hickory,	26,000	2.94	55 85	1,452	.....	26,000
Boxwood,	25,600	2.90	362 28	9,300	.....	25,600
Red gum,	20,000	2.27	50 00	1,000	.....	20,000
Basswood,	12,500	1.42	32 48	406	5,000	7,500
Weichsai roots,	30	*	540 00	16	.....	30
Total,	882,880	100.00	\$63 90	\$56,412	500,100	382,780

*Less than 1-100 of 1 per cent.

Woods for canes and parasol and umbrella handles purchased by the piece:

Apple.	Haw (black thorn).
Apricot.	Holly.
Arbor vitae.	Hop tree (hopwood).
Bamboo.	Hornbeam (ironwood).
Birch.	Huckleberry tree.
Black ash.	Lancewood.
Black gum.	Laurel.
Black walnut.	Lilac.
Butternut.	Madagascar.
Cherry.	Mahogany.
Chestnut.	Malacca (rattan).
Chestnut oak.	Morello cherry (sweet cherry).
Circassian walnut.	Orange wood.
Corra.	Osage orange.
Crab apple.	Paper birch (gray birch).
Cucumber.	Partridge.
Dogwood.	Peach tree.
Elm.	Pear tree.
English oak.	Persimmon.
French oak.	Plum.
Furze.	Poison Sumach.
Hazelnut.	Quince.

Red cedar (juniper).
Red oak (jersey oak).
Rice root.
Sassafras.
Savin (red cedar).
Scotch thistle.
Siberian crab.
Slippery elm.
Striped maple (swamp dogwood).

Sweet (cherry) birch.
Sycamore.
Whangee.
White ash.
White oak.
White thorn.
Willow.
Yellow birch.
Yellow poplar (hickory poplar).

PLUMBERS' WOODWORK.

In connection with bathroom and toilet furnishings and other forms of plumbing installation there are certain useful commodities made of wood which have been grouped under this heading and the materials used for making them presented in Table 83. Drainboards, which serve as dish washing tables, connected with the sink, call for a large quantity of wood which, on account of holding its shape, ash alone supplied. Usually these boards are grooved to facilitate drainage. Sweet birch, finished with a high polish, was mainly used for bath stools, some in imitation of mahogany but most of them painted or enameled white, the birch being specially adaptable to both kinds of finish. Water closet seats, lids, and tanks, are the other commodities of this industry in Pennsylvania and like the wood for fixtures and furniture, high grade material with considerable figure and susceptible of taking a polish is largely demanded. Yellow poplar is an exception as it answers in large amounts only for white enameled finish and is desired because it holds its shape, takes paint readily, and is moderately strong. Birch is probably equally suitable except that it is more liable to warp, but this is overcome in the superior advantages it offers in being stronger and affording a higher polish. White and red oak, including considerable quartered stock, cherry, mahogany, ash, and sweet birch used for exterior work are the woods selected for figure and are finished natural with wax or varnish. Chestnut in some states was reported among these woods but in Pennsylvania where it is extensively cut, the manufacturers of plumbing woodwork made no mention of it. This industry does not depend largely upon the forests of the State as the manufacturers report only 15 per cent. of all the wood they used as State-grown.

Table 83.—Wood for Plumbers' Woodwork, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
White oak,	189,500	32.43	\$43 78	\$8,297	40,000	149,500
Yellow poplar,	131,000	22.94	40 00	5,300	.....	131,000
Ash,	110,000	18.83	34 00	3,740	.....	110,000
Birch,	95,000	16.26	30 95	2,940	75,000	20,000
Red oak,	30,000	5.13	30 00	900	30,000	.....

Table 83—Concluded.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Shortleaf pine,	12,250	2.10	28 00	343	.....	12,250
Mahogany,	6,000	1.03	155 00	930	.....	6,000
Cherry (black),	4,400	.75	94 55	416	400	4,000
White pine,	2,500	.43	36 00	90	.....	2,500
Sugar maple,	300	.05	30 00	9	.....	300
Black walnut,	300	.05	35 00	10	300	.....
Total,	584,250	100.00	\$39,43	\$23,035	145,700	433,550

INSULATOR PINS AND BRACKETS.

Durability and strength are the requisite qualities of insulator pin material, and locust is the wood principally used in their manufacture. In the country at large, its use for this purpose exceeds seven times the amount of all other woods combined and in Pennsylvania over 425,000 feet are used each year. White oak, red oak, elm, and osage orange are other woods used for pins in various states, but, unlike locust, where these are employed they are ordinarily dipped in paint or some antiseptic solution, such as creosote, in order to increase their durability. In Pennsylvania locust was the only wood reported for insulator pins and the other woods appearing in the table were used for pole brackets.

Table 84.—Wood for Insulator Pins and Brackets, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Locust (black),	463,500	80.12	\$23 90	\$11,076	463,500	.....
White oak,	60,000	10.37	13 33	800	60,000	.....
Red oak,	55,000	9.51	11 82	650	55,000	.....
Total,	578,500	100.00	\$21 65	\$12,526	578,500	.....

BUTCHERS' BLOCKS AND SKEWERS.

The two important woods for butchers blocks are sycamore and sugar maple. On account of their desired qualities, hardness and uncleanability, together with their strength and tastelessness, they are first among the domestic woods for this use. Formerly butchers' blocks were round, usually

a cross section of a large tree barked and trimmed symmetrically, varying in thickness from 18 to 30 inches. It is exceedingly difficult to season pieces of this size thoroughly and trouble results by blocks checking, rendering it difficult to keep them clean and sanitary. Lately considerable improvement in seasoning processes has partly overcome the only objection to sycamore blocks. The advancement made in the art of gluing woods, which has brought into prominence built-up lumber, has entirely overcome all checking difficulties and enabled the making of blocks lighter in weight but with requisite strength, equally as serviceable and with a more attractive appearance.

The built-up block is the only kind of block being made in Pennsylvania, and sugar maple is the wood used. The size of the pieces that are glued differ slightly according to the dimensions of the finished block but most commonly they are 3 inches thick, 4 inches wide, and 16 to 18 inches long. It is very important that the lumber for the blocks be thoroughly seasoned and to bring it to the desired condition both air and kiln-drying methods are used. Before gluing the pieces together, they are jointed by machinery in order that they fit perfectly, leaving no apertures along edges for glue to collect and thus taint the meat. That they may more readily adhere to the glue the smooth flat surfaces are roughened. This process is important since the rough usage given the meat block brings great strain on the glued joints which must be as strong as it is possible for the best glue to make them. The flat glue joint is used and to weld the pieces together after being heated and covered with glue, they are subjected for 12 or 14 hours to the pressure of a hydraulic machine. They are then bored for several iron rods that are added as a reinforcement for the glued joints. The legs are made usually of the same kind of wood as the meat blocks, namely, maple, but sometimes red oak is used.

Hickory and white pine are the principal woods used for skewers. Those made from the latter wood are employed in kitchens for holding in shape croquettes and other dainties and by confectioners for taffy sticks. Hickory skewers were made to meet the demand of the butchers. Beech and maple are prominent for meat skewers but none were reported by the manufacturers in Pennsylvania where these woods are common lumber trees.

Table 85.—Wood for Butchers' Blocks and Skewers, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Sugar maple,	270,000	£1.92	\$20 37	\$5,500	270,000	.....
White pine,	200,000	38.46	22 00	4,400	200,000	.....
Hickory,	50,000	9.62	18 00	900	50,000	.....
Total,	520,000	100.00	\$20 77	\$10,800	520,000	.....

WEIGHING APPARATUS.

This industry as measured by the consumption of wood is one of the small ones of this report. It includes material for scale manufacture such as is used by railroads, called track scales and hay wagon scales, often used in coal yards, besides platform and counter scales for stores, warehouses, and cabinet scales such as are used for compounding medicines, weighing gold, silver, and precious stones.

Longleaf pine is the most common wood for large scales on account of its durability, strength, and elasticity. It goes principally into the framework of track and wagon scales and was shipped to Pennsylvania from the Gulf states. Sugar maple is next in quantity answering more for the counter and platform scales than any other use because, being hard, tough, strong, and close grained with a tendency to wear smooth, it is specially adapted for this purpose. The handsome finish of mahogany and cherry, together with their compact structure, and the property of holding their shape, commend them for use as material for making the basal parts of cabinet scales and for the frame of the glass cases usually enclosing these scales.

Table 86.—Wood for Weighing Apparatus, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Longleaf pine,	200,000	50.84	\$30 00	\$6,000	.....	200,000
Sugar maple,	171,000	43.47	33 13	5,665	21,000	150,000
Yellow poplar,	10,000	2.54	25 00	250	10,000	.....
Cherry (black),	7,500	1.90	27 00	202	7,500	.....
Mahogany,	4,000	1.02	90 00	360	.....	4,000
Ash,	900	.23	93 06	84	900	.....
Total,	393,400	100.00	\$31 93	\$12,561	39,400	354,000

PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.

The amount of lumber used by this industry is relatively very small, but the products grouped under it are numerous and vary according to the uses they serve in the several trades or professions included. In the quantity of wood used the pencil makers are the most important class. Similar to the pencil manufacturers in New Jersey, New York, and other states, they report using only one wood, red cedar, which is brought to Pennsylvania from the southern states. Tennessee and Florida are at present the centers of production of this wood. Other kinds, both domestic and foreign, have been considered as possible substitutes because of the growing scarcity of red cedar, but the experiments indicate that only a few species have been found fairly successful and these answer mostly for a cheap pencil. This brings out how difficult it is to find a wood combining all the qualities requisite for pencil material and how essential it is that pencil woods possess qualities almost identical to red cedar. Pencil makers procure their raw material in the form of slats that are usually $2\frac{1}{2}$ inches wide and 7 inches

long, and $\frac{1}{4}$ inch thick. Not frequently the pencil makers manufacture their own slats, but there are concerns specializing in cedar products who convert their best material into pencil slats and the remainder into lumber for utility boxes, furniture squares, and closet linings. Formerly when cedar was abundant pencil slats were manufactured entirely from logs, but rapidly decreasing supply of cedar timber has brought into the market old stumps, fence rails, gate posts, barn and cabin logs, and material in various shapes and condition, even partly decayed and weather checked. As can be expected, therefore, waste incident to the sawing of pencil slats is large and has been estimated to be about four-fifths of the original amount purchased. A pencil slat makes six half-pencils. The same operation that grooves them to accommodate the lead also gives them their final form and the corresponding halves are identically made from another slat and glued together.

Carpenters' tools belong to this industry. They include commodities made almost entirely of wood such as spirit levels, rules, gauges, mallet heads, level boards, etc. Tools part wood and part metal like screwdrivers, chisels, gimlets, etc., have been grouped under the handle industry. White oak alone met the demand for gauges which require a hard dense light colored wood and from the price given only the best grades were used. In other States boxwood and sugar maple were also used but neither kind was reported in Pennsylvania. White ash and mahogany, because most stable when in place, answered for spirit levels and plumbs. In Connecticut and New Jersey, where a quantity of these commodities are made, cherry is an important wood and large quantities are used. Level boards were entirely of white pine, while for mallets a variety of woods is used. For carpenters' and tinners' mallets sugar maple answered while lignum-vitae, shipped from Mexico, and dogwood served for bung starters and coppersmiths' mallets. Heads of mauls used by sheet metal workers are made of black or sour gum and it is interesting to note that recently this wood has begun to replace sugar maple for this use. Its interlaced fiber, which prevents it from splitting, commends it, besides it is cheap and owing to the large dimensions the trees attain the bolts can readily be had in desired sizes.

In Pennsylvania, as in other states, boxwood is the principal rule material, both for mechanics' collapsible rules and office rulers. It is shipped to this country usually from Turkey or other Mediterranean countries, and owing to its hardness, light color, and stability, it is preferred to any other wood for this commodity. The same qualities commend it to the makers of draftsmen's scales, such as straight-edges, triangles, graduated and slide rules.

Camera makers report using three woods,—mahogany, cherry, and yellow poplar. The first two are the important ones, being strong, close-grained, and free from warping tendencies as well as ornamental. Yellow poplar is used in only relatively small amounts in this line of work and when so demanded goes principally into kits. Ebony was the highest priced wood shown in the table and was reported by the makers of drafting instruments.

Table 87.—Wood for Professional and Scientific Instruments, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Red cedar,	240,000	73.52	\$52 00	\$12,480	.....	240,000
Yellow poplar,	16,400	5.02	73 78	1,210	.....	16,400
Ash,	15,000	4.60	58 67	880	5,000	10,000
Black gum,	12,000	3.68	52 83	634	2,000	10,000
Cherry (black),	10,000	3.06	100 00	1,000	.....	10,000
White oak,	10,000	3.06	55 00	550	.....	10,000
Dogwood,	7,200	2.21	38 47	277	1,000	6,200
Mahogany,	5,118	1.57	169 21	866	.....	5,118
Sugar pine,	5,000	1.53	70 00	350	.....	5,000
Boxwood (West Indian),	2,300	.70	55 00	126	.....	2,300
Lignum-vitæ,	1,000	.31	120 00	120	.....	1,000
White pine,	1,000	.31	90 00	90	.....	1,000
Sugar maple,	930	.28	40 00	37	500	430
Ebony,	500	.15	260 00	130	.....	500
Total,	326,448	100.00	\$57 44	\$18,750	8,500	317,948

PULLEYS AND CONVEYORS.

The commodities grouped in this industry are tackle blocks, belt pulleys, conveyors, and clutches, and thirteen kinds of wood are used for making them. Metal has to a large extent replaced wood in this line of manufacture, but studies similar to this in various states have shown that a considerable quantity of wood is still demanded for making them. For belt pulley rims the manufacturers in Pennsylvania call for birch, basswood, yellow poplar, cucumber, cottonwood, and butternut, and for the center arms, red oak, white oak, sugar maple, ash, and beech.

Tackle block material must be dense, hard, strong, tough, and most difficult to split. White ash, sugar maple, and a small amount of black gum are the woods reported in use in Pennsylvania though in other states elm is frequently used. Pulley blocks are of many types and sizes in order to meet a variety of uses. For example, those required on vessels, in building construction, in mines, on derricks and hoists by house painters, masons, carpenters, etc., range from a snatch block to the multiple pulley blocks. The latter is usually of the shoulder block type and designed for one or more sheaves. It is sometimes chambered out to receive a wheel in each compartment while at other times two or more wheels are placed side by side in a section. The old time block maker did much of the work by hand, but the improved machinery in recent years does the work with greater accuracy and in much less time. The lumber is ripped into dimensions the width of the block and the reciprocating saw then cuts the dimensions into shape, when they are passed on to be mortised. Often the wheel slats are cut by machinery and then the blocks are ready for the sheaves.

A small part of this industry consists in the manufacture of conveyors such as are used in factory elevators and warehouses to carry merchandise and grain. These require only a limited amount of wood for small parts and white oak and sugar maple are the species reported.

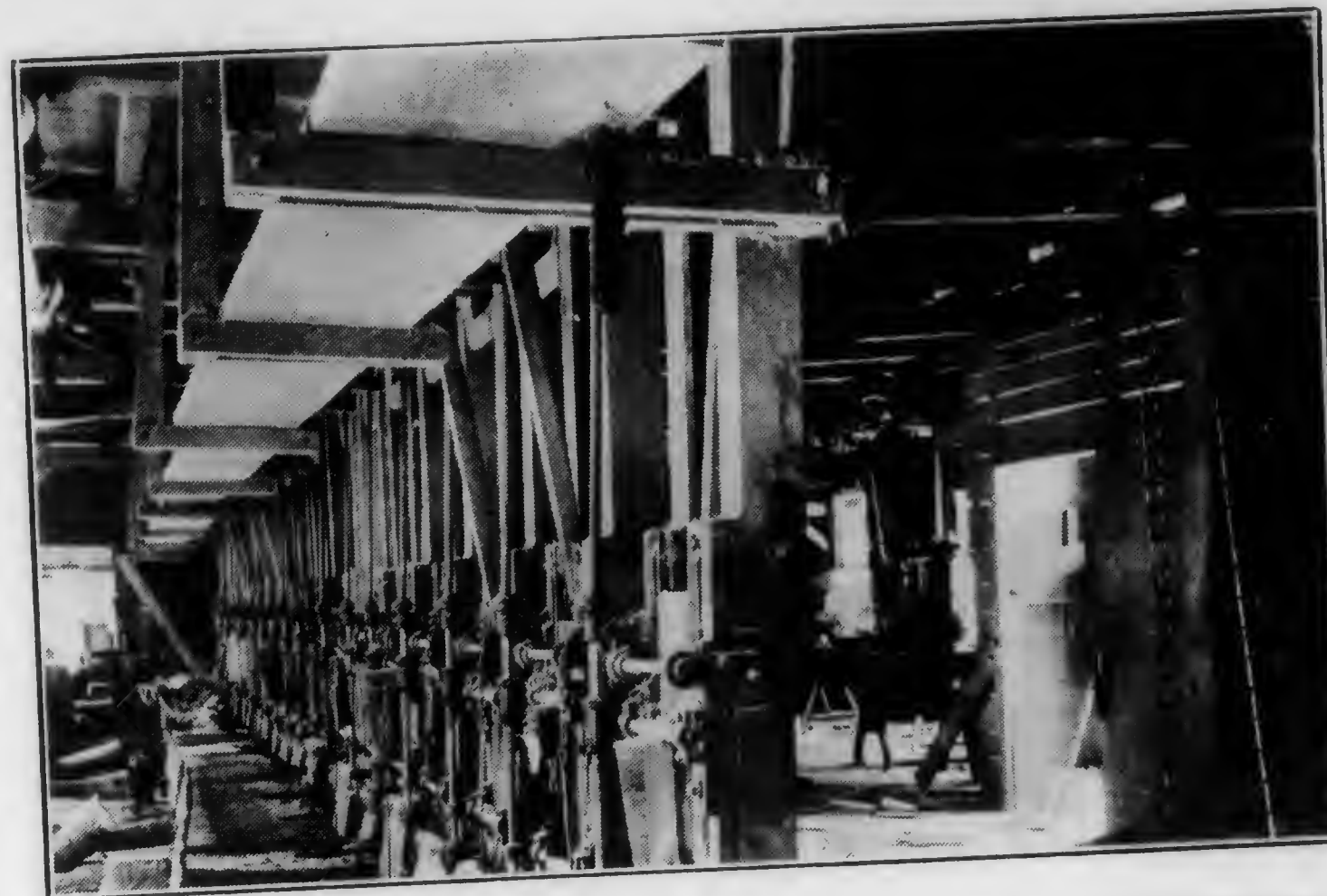


Fig. 30 —Interior of excelsior factory, showing billets in place in excelsior machines.



Fig. 31.—Finished excelsior ready for baling.

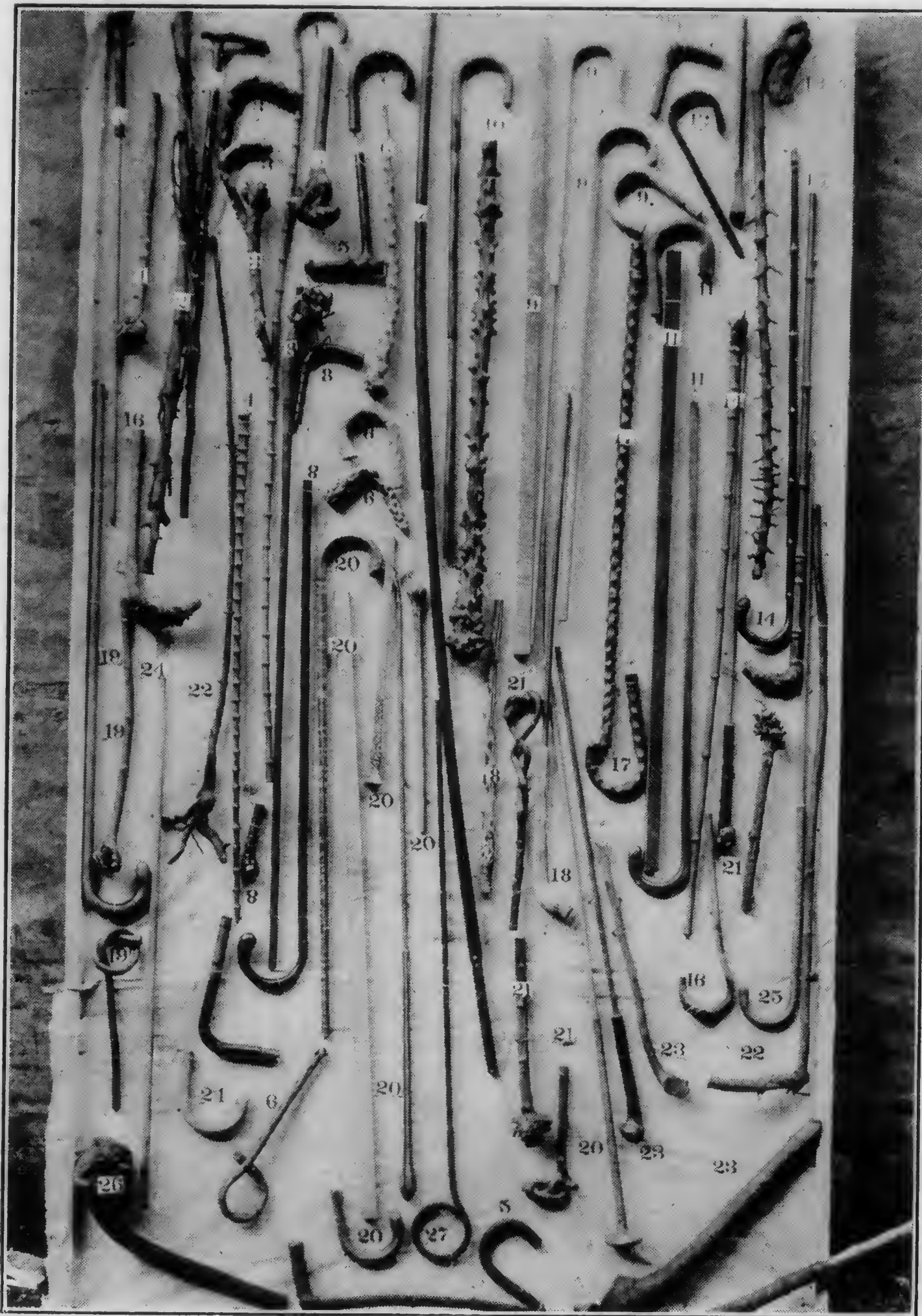


Fig. 32.—Whips, canes, and umbrella handles, and rough stock from which they are manufactured.

DESCRIPTION OF FIGURE 32.

1. Butt cut seedling and umbrella handle—sweet birch.
 2. Cut of seedling and cane—osage orange.
 3. Butt-cut seedlings, two umbrella handles—boxwood.
 4. Whangee cuts, one bent ready to be cut into cane length.
 5. Three designs of weichsel umbrella handles.
 6. Butt-cut of furze, 1 parasol and 2 umbrella handles.
 7. Malacca (rattan) cut and cane.
 8. Butt cut seedling, umbrella handle and cane—partridge.
 9. Rough sawn billet, parasol handle and cane—holly.
 10. Madagascar cut—natural cane ready for ferrule.
 11. Rough sawn billet, umbrella handle and cane—applewood.
 12. Two parasol and one umbrella handle—ebony.
 13. But-cut seedling of haw (black thorn).
 14. Cut of bamboo and cane.
 15. Corra cane with rice-root handle.
 16. Rice-root from which handle of 15 was made.
 17. Cut of Congo and umbrella handle.
 18. Cut of Scotch thistle and parasol handle.
 19. Butt-cut seedling, umbrella handle and cane—dogwood.
 20. Rough sawn billet, cane, umbrella and 4 parasol handle—sugar maple.
 21. Butt-cut seedling, 4 umbrella handles—French oak.
 22. Butt-cut seedling—black ash.
 23. Two butt-cut seedlings and umbrella handle—hickory.
 24. Cut of lancewood and umbrella handle.
 25. Morillo cherry (sweet cherry) parasol handle.
 26. Congo root for umbrella handle.
 27. Red oak (Jersey)—parasol handle.
- Cuts of white thorn and bamboo unnumbered, at bottom of illustration

Table 88.—Wood for Pulleys and Conveyors, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Yellow poplar,	80,000	27.16	\$28 75	\$2,300	10,000	70,000
Sugar maple,	68,000	23.09	43 68	2,970	68,000	2,000
Basswood,	40,000	13.58	20 00	800	40,000	.....
Ash,	15,000	5.09	30 00	450	7,000	8,000
Beech,	15,000	5.09	20 00	300	15,000	.....
Black gum,	14,000	4.75	33 71	472	.....	14,000
White oak,	10,500	3.56	30 95	325	10,500	.....
Birch,	10,000	3.40	20 00	200	10,000	.....
Red oak,	10,000	3.40	25 00	250	10,000	.....
Red and silver maple,	10,000	3.40	14 00	140	10,000	.....
Cucumber,	10,000	3.40	18 00	180	10,000	.....
Butternut,	10,000	3.40	20 00	200	10,000	.....
Cottonwood,	2,000	.68	21 00	42	2,000	.....
Total,	294,500	100.00	\$29 30	\$8,629	200,500	94,000

BOOT AND SHOE FINDINGS.

Nearly all shoes in the United States are made over wooden lasts and, therefore, the manufacture of these lasts as well as other shoe findings is an important enterprise. In comparison with the quantity of woods consumed in other states, particularly Massachusetts, Michigan, New Hampshire, and New York, this industry in Pennsylvania is relatively small; but because of the substantial well equipped establishments, of the skilled labor employed, and in the high grade of products manufactured, it is of considerable industrial importance. Lasts, shoe forms, and wood soles are the commodities to which the statistics in Table 89 refer.

Lasts are made from sugar maple and persimmon because they possess the essential qualities of hardness, density, capacity for smooth finish, and permanence in final shape. No other domestic woods have been found equally suitable. The former goes into lasts, all sizes and kinds, both for leather and rubber shoes, and the latter for the better grades of children's and misses' sizes. Considering the great number of shoes made in this country, comparatively few lasts are needed as many pairs are made over the same pattern. The wear on the last is considerable and it can be used steadily for no longer than twelve to fifteen months. For that reason only the high grade select wood is required.

There are two distinct divisions of the last industry,—the manufacture of the last block from bolts, and the manufacture of the finished last from the rough turned blocks. The industry in Pennsylvania covers only the manufacture of the latter and the fact that no last and filler blocks were found being made in the State, though maple and basswood are commonly cut in Pennsylvania, explains the fact that the entire amount of wood used by the last makers was reported as coming from other states.

Last block manufacture entails various difficulties in kiln-drying and many who have started the business have failed. Those who have mastered the obstacles and acquired efficient processes of seasoning manufacture on a



Fig. 33.—Manufacturer of shoe lasts. Roughly cut billets and the finished lasts turned from them.



Fig. 34.—Evolution of a shoe last.

large scale and therefore reduce the number of block factories many times below the number of the last makers. Last blocks are split from bolts winter cut and then rough turned to various sizes on machines usually of special design. The seasoning begins after the blocks are turned. First, they are air-dried about twelve months after they are placed on racks under sheds. The seasoning is completed by means of dry kilns and for this a period, approximately three months, is required when the block is ready to send to the last maker.

Shoe trees, to be inserted into shoes to hold the shape, are an important part of this industry but none are manufactured in Pennsylvania. Formerly they were made solid of wood and were expensive. The best are still so made; but recently, by the introduction of a combination tree of steel bands and wood blocks, it has been made possible to make them to sell at a nominal cost.

Basswood is used as exclusively for forms or fillers as is sugar maple for lasts. Forms are turned similarly from rough turned blocks. They are used to maintain the natural shape of the shoe in samples displayed in show cases and when being handled by traveling salesmen. They fit the shoes perfectly and give an effect similar to the appearance of the shoe on the foot. Fillers should be light in weight to save cost in transportation in salesmen's trunks. To reduce weight to the minimum many are hollowed, and basswood being soft, easily worked, light, and sufficiently tough, holding its shape well, is the most practical wood to use. The growing high cost of basswood has made a demand for a suitable substitute at a lower price but as yet none has been found.

Clog or wooden soled shoes have leather tops and are used by people working in wet and cold places, such as breweries, tanneries, creameries, mines, dye works, fish canneries, slaughter houses, paper mills, also in foundries and metal works, and by others who desire a very durable shoe at a reasonable price. High grades of yellow poplar and basswood are the materials demanded for clog soles in Pennsylvania, but in Illinois, Michigan, and Kentucky, beech, maple, and basswood in the order named contributed the material.

Table 89.—Wood for Boot and Shoe Findings, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Sugar maple,	100,500	37.92	\$55 86	\$5,614	.....	100,500
Persimmon,	99,000	37.36	59 19	5,860	.....	99,000
Basswood,	35,500	13.40	50 73	1,801	18,000	17,500
Yellow poplar,	30,000	11.32	56 67	1,700	.....	30,000
Total,	265,000	100.00	\$56 51	\$14,975	18,000	247,000

SMOKING PIPES.

Pennsylvania leads all other states in the consumption of wood for smoking pipes. Five woods supply the raw material for this line of manufacture; two of them are foreign species. Applewood leads the list as to amount, and is the only wood reported cut in the State. The best grades of pipes are made from French briar, ebony, and rosewood, but the last named was not reported in Pennsylvania. The sapwood of sweet or cherry birch and red gum is used for cheap pipes, the former to imitate calabash and the latter rosewood. Olivewood pipes resemble meerschaum when finished.

Table 90.—Wood for Tobacco Pipes, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Applewood,	121,435	53.38	\$52 42	\$6,372	61,435	60,000
French briar,	81,800	35.95	351 34	28,740	.....	81,800
Red gum,	12,000	5.27	50 00	600	.....	12,000
Ebony,	9,800	4.31	183 67	1,800	.....	9,800
Birch,	2,000	.88	50 00	100	.....	2,000
Olive wood,	480	.21	81 25	39	.....	480
Total,	227,515	100.00	\$165 49	\$37,651	61,435	166,080

SPORTING AND ATHLETIC GOODS.

Ash, on account of its strength and convenient weight, is probably the premier wood for baseball bats. The entire amount listed in Table 91 went for this use, and most of it was purchased in the form of squares, usually 3 inches by 3 inches by 38 inches long. In other states bat manufacturers used several woods, the principal ones other than ash being hickory, willow, beech, ironwood, and maple. Though all of these are trees indigenous to Pennsylvania, and the wood easily obtained, the manufacturers in this State did not report the use of any.

Twice as much beech was used for game traps as any other wood and its strength and density especially favor it for this purpose. Hard maple, its chief competitor, with small quantities of ash and birch supplied the rest of the material, purchased in the form of surfaced lumber. All used was cut in the State.

Sugar maple, hard, tough, close grained, easily turned, has proved the best qualified wood for duck and ten pins. The quantity used in Pennsylvania is somewhat disappointing considering the large quantity of pins sold. Information was secured of a large number of duck pin squares being cut in the State, but they were shipped elsewhere to be manufactured and doubtless are sent back to be sold in the finished product. Lignum-vitae answered for bowling balls and, though a composition ball resembling hard rubber is being more generally used, the best bowlers prefer the wooden ball. Lignum-vitae is the highest priced wood shown in the table and is bought in the form of bolts shipped from the West Indies. No domestic wood possesses the com-

bined qualities for balls equal to lignum-vitae. It is very heavy, hard, dense, strong, and keeps its shape. Dogwood is the nearest approach and is used to a limited extent but is not durable. None was reported in Pennsylvania.

Sugar maple and longleaf pine are the most used woods for bowling alleys. The latter wood, edge grain and best grade, is used for the bed of the alley, and the former for the approach and pin spot end and also for the return track. Spruce or longleaf pine are the best for the gutters, and for the buffer frames and sheathing shortleaf pine and hemlock were called for.

Pool and billiard tables and shuffle boards account for the rest of the woods not mentioned above which are listed in the table. Chestnut and yellow poplar answers for frames of pool and billiard tables, red oak, white oak, ash, and sugar maple for the legs and also for sides and bodies. Cherry went into triangles for setting pool balls and maple was the only wood for cues.

Table 91.—Wood for Sporting and Athletic Goods, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Sugar maple,	97,500	45.32	\$36 14	\$3,524	47,500	50,000
White oak,	41,500	19.29	38 27	1,588	31,000	10,500
Ash,	30,000	13.94	66 83	2,005	30,000	.....
Beech,	20,000	9.30	17 25	345	20,000	.....
Cottonwood,	10,000	4.65	32 00	320	.....	10,000
Chestnut,	10,000	4.65	33 00	330	5,000	5,000
Yellow poplar,	5,000	2.32	28 00	140	5,000	.....
Lignum-vitae,	550	.25	118 18	65	.....	550
Red oak,	500	.23	35 00	17	500	.....
Cherry (black),	100	.05	46 00	5	100	.....
Total,	215,150	100.00	\$38 76	\$8,339	139,100	76,050

SADDLES AND HARNESS.

Hames are the principal commodity included in the following table. They require a tough, strong, close wood. Ash and white oak furnished the largest portion of the supply of raw material in Pennsylvania, which was purchased in the form of squares of various sizes, the principal sizes being 2½ inches by 2½ inches, 30 inches long, and 2¾ inches by 2¾ inches, 32 inches long. White ash was the favorite as to quantity. Black ash and hickory, though used, contributed but small amounts. Pennsylvania is the first state in which hickory has been reported by hame manufacturers though it has for a long time been used by farmers for hand-made hames. According to reports from factories in other states, ironwood, sugar maple, beech, white elm, and red oak are suitable hame materials though their use was not reported in large quantities.

White ash was the only wood called for in Pennsylvania for making saddle trees, which is the only product except hames classed under this heading. From other similar state reports, ash, though adaptable, is an unimportant wood for this use. The kinds most used named in the order of quantity and selected because of the quality of toughness with requisite weight are: White

elm, cottonwood, sycamore, soft maple, white oak, ash, hackberry, and basswood.

Table 92.—Wood for Saddles and Harness, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Ash,	100,000	53.19	\$44 80	\$4,480	76,000	24,000
White oak,	70,000	37.23	71 43	5,000	60,000	10,000
Hickory,	10,000	5.32	60 00	600	.....	10,000
Red oak,	8,000	4.26	40 00	320	.....	8,000
Total,	188,000	100.00	\$55 32	\$10,400	136,000	52,000

GATES AND FENCING.

Table 93 lists seven woods used in Pennsylvania for fence pickets and gates, both farm gates and those used for the enclosure of front yards and lawns. White cedar, shipped in from the Carolinas, stands first as to quantity and in no other industry was it the principal wood. Its durability in exposed situations especially commends it for this use. Spruce is listed in the table in large quantities and the fact that it was preferred to several State-grown woods that could probably have been obtained cheaper and known to be more durable, is worthy of note. The durable properties of cypress, together with its strength, favor it also as an excellent wood for gate and fencing material. That cypress is demanded for the best lines of work of this character is seen from the fact that it is the only wood reported by railroads for crossing gates. In the lower grades it is popular for lawn fence pickets, for which use it serves with chestnut and white pine. Stubs, the wooden parts of patent woven wire fencing, called for chestnut and white cedar. Though white cedar was used in larger quantities, yet chestnut, because it is cheaper and at the same time possesses lasting qualities for outdoor uses, is destined to grow in favor for this purpose.

Table 93.—Wood for Gates and Fencing, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Southern white cedar,	100,000	61.98	\$20 00	\$2,000	.....	100,000
Spruce,	36,000	22.31	25 00	900	.....	36,000
Chestnut,	11,500	7.13	25 39	292	6,500	.....
White pine,	5,000	3.10	22 00	110	5,000	.....
Yellow poplar,	5,000	3.10	26 00	130	5,000	.....
Cypress (bald),	3,840	2.38	55 00	211	.....	3,840
Total,	161,340	100.00	\$22 58	\$3,643	16,500	144,840

CLOCK CASES.

In the quantity of wood consumed, the manufacture of clock cases in Pennsylvania is one of the minor industries. However, since wood is only one of a number of materials required, it is not a fair basis for comparison. Clock makers report the use of lumber for mantel and wall clocks, and to a limited extent for large hall and grandfather clocks. Mahogany is the principal wood used and represents over 50 per cent. of the total. This is the only industry in which an imported wood leads the list of species. Next to mahogany, the oaks were in the largest demand for the exterior work of wall clocks finished natural or darkened by fumes or stain to produce the mission effects.

The backs of cases of all kinds and the bottoms of mantel clocks are not visible and are therefore made of cheaper wood. Yellow poplar and basswood met this demand because they hold their shape and are easy to work and nail. Yellow poplar is also called on to a limited extent for the base or backing of enameled work. The art of enameling wood has made rapid progress of late years and imitations are made not only to resemble foreign woods but also marble and other materials.

Veneer takes a prominent place in this industry, both as a finish and as layers in 3-ply built-up stock used in making clock cases. The appearance of chestnut and yellow poplar in the table is accounted for in this form. In regard to the price shown for red gum, it should be noted that it was used for finish or exterior work and as it is frequently found beautifully modeled with figure and color similar to Circassian walnut it furnishes a substitute for that wood for finish.

Table 94.—Wood for Clocks, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.				
Mahogany,	43,000	30.83	\$103 84	\$4,465	.....	43,000
Yellow poplar,	35,000	25 09	33 57	1,175	.....	35,000
Black walnut,	21,000	15.05	50 95	1,070	21,000	.....
White oak,	13,500	9.68	74 30	1,003	.....	13,500
Red gum,	10,000	7.17	60 00	600	.....	10,000
Chestnut,	5,000	3.58	30 00	150	5,000	.....
Basswood,	5,000	3.58	60 00	300	.....	5,000
Birch,	4,000	2.87	45 00	180	.....	4,000
Red oak,	3,000	2.15	45 00	135	.....	3,000
Total,	139,500	100.00	\$65 08	\$9,078	26,000	113,500

ROLLERS AND POLES.

Window shade rollers belong to this industry but none are manufactured in Pennsylvania, though sawmills cutting white pine were found furnishing large quantities of material in the desired form to the New York shade roller makers. Curtain poles and brackets, rug and drugget poles, and awning rollers are the articles to which the statistics in Table 95 refer. Basswood is the leading wood and it went entirely into curtain poles. It serves well for this use, first, because it is so easily worked, and second, the ease and permanence with which it takes paint and stain allows it to be finished to imitate expensive hardwoods like walnut, mahogany, and oak. Hard maple, sweet birch, white oak, and white ash are other important curtain pole woods and the ones reported mainly for curtain pole fixtures and brackets.

Rug and drugget pole manufacturers called principally for black gum, but beech, basswood, and yellow poplar met part of the demand. Awning rollers require a heavy wood. Sugar maple, hickory, beech, and black gum were the ones reported. The two former, being expensive, were used in small quantities only. Black gum is practically a new wood for this use but the demand is increasing owing to its being one of the cheapest hardwoods with the requisite weight, strength, and adaptability for being turned. Redwood was the only wood reported for shade hangers.

Table 95.—Wood for Rollers and Curtain Poles, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
Basswood,	37,500	29.86	\$20 00	\$750	37,500	.....
Sugar maple,	27,425	21.84	16 59	455	27,000	425
White oak,	19,000	15.13	16 63	316	19,000	.....
Beech,	12,000	9.56	14 00	168	12,000	.....
Birch,	12,000	9.56	14 00	168	12,000	.....
Ash,	6,150	4.90	32 88	201	5,000	1,150
Black gum,	6,000	4.78	20 00	120	.....	6,000
Hickory,	2,500	1.99	60 00	150	2,500	.....
Redwood,	2,000	1.59	45 00	90	.....	2,000
Yellow poplar,	1,000	.79	65 00	65	.....	1,000
Total,	125,575	100.00	\$19 77	\$2,483	115,000	10,575

MANUAL TRAINING PRACTICE.

Improved systems of public school education today endeavor to give not only a thorough grounding in the usual elementary subjects but also offer opportunities to acquire the fundamentals of various artisan trades by methods of practical work in the laboratory, the shop, or the field. These specialized schools or departments are known as "Manual Training" and in connection with the excellent system of public education in Pennsylvania there has been established a large number of them throughout the State. They offer instruction in a diversity of practical courses. Important among these is wood craft. Shops equipped with tools of all kinds and with wood-working machinery afford training in the making of many kinds of commodities and an insight into all lines and processes of wood-working. Woods that are soft and possess properties to work easily are naturally the kinds in greatest demand. That white pine, yellow poplar, and basswood head the list in Table 96, therefore, is not surprising, but that so small amounts of yellow pine and hemlock are employed, these being the cheapest woods, is interesting, especially as these woods are important in many wood manufacturing industries. If both the red and white oaks had been compiled under one heading, oak, this wood would have been first in the table. Of the twenty species used, mahogany is the highest priced and beech the lowest.



Fig. 35.—Evolution of a briar pipe.

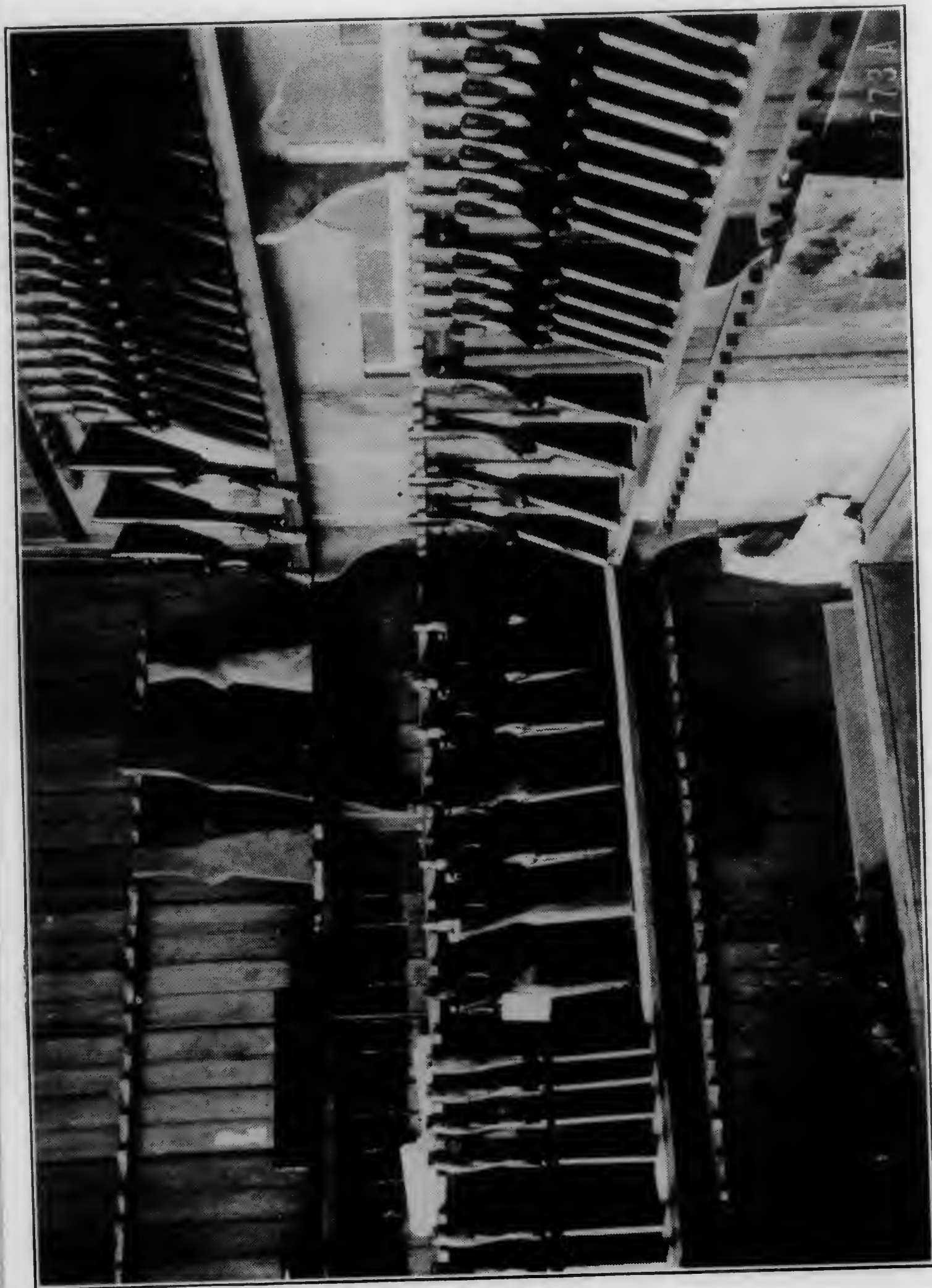


Fig. 36.—Evolution of a gun stock and a number of finished stocks ready for market, made of black and Circassian walnut.

Table 96.—Wood for Manual Training Practice, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	Grown Out of Pennsylvania.
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
White pine,	21,575	22.49	\$72 35	\$1,561	8,675	12,900
Yellow poplar,	16,250	16.94	66 95	1,088	9,550	6,700
Basswood,	14,400	15.01	43 06	590	7,650	6,750
Red oak,	13,070	13.62	72 61	949	9,070	4,000
White oak,	10,500	10.94	53 81	881	4,950	5,550
Chestnut,	7,000	7.30	64 14	448	5,000	2,000
Sugar maple,	3,350	3.49	50 45	169	3,050	300
Cherry (black),	1,850	1.93	55.68	103	1,850	.....
Cypress (bald),	1,750	1.82	63 43	111	.....	1,750
Ash,	1,100	1.15	70 91	78	300	800
Hickory,	934	.97	70.66	64	234	700
Black walnut,	850	.89	87 06	77	650	200
Mahogany,	750	.78	134 67	101	.....	750
Beech,	600	.62	28 33	17	600	.....
Sugar pine,	500	.52	80 00	40	.....	500
Red gum,	470	.49	72 34	34	.....	470
Red cedar,	400	.42	97.50	39	.....	400
Hemlock,	262	.27	34 35	9	262	.....
Shortleaf pine,	250	.26	40 00	10	.....	250
Redwood,	50	.05	60 00	3	.....	50
Dogwood,	34	.04	90 00	3	34	.....
Total,	95,945	100.00	\$66 44	\$6,375	51,875	44,070

MISCELLANEOUS.

In soliciting information from the various manufacturers concerning the extent of their operations in the consumption of wood, the Forest Service and the Pennsylvania Department of Forestry made assurance that the data would be treated confidentially and not used in the report so as to reveal the identity of the establishments furnishing it. Whenever, therefore, fewer than three factories making similar commodities were entitled to be grouped as an industry, rather than discard the information from the report it was placed under the head "Miscellaneous."

The nearly seven and a half million feet shown as the total of the table includes considerably over five million of State-grown white pine for matches, more than 100 M feet of beech cut in the State for brewer chips, used in breweries to clarify beer, nearly 200 M feet of white ash, Douglas fir, soft maple, and beech for flag poles and shafts, and nearly one-half that amount consisting of spruce, hemlock, and yellow pine for tent poles. Small quantities of red cedar were used for oil barrel faucets, and black walnut and Circassian walnut for stocks and fore-ends of both fire-arms and of air rifles.

Table 97.—Wood for Miscellaneous, year ending June, 1912.

Kind of Wood.	Quantity.		Average cost per 1,000 ft. at factory.	Total cost f. o. b. factory.	Grown in Pennsylvania.	
	Feet b. m.	Per cent.			Feet b. m.	Feet b. m.
White pine,	7,002,000	94.41	\$16 00	\$182,070	7,002,000	.....
Beech,	175,003	2.36	14 86	2,600	175,003	.....
Red and silver maple,	50,000	.67	14 00	700	50,000	.....
Ash,	50,000	.67	25 00	1,250	50,000	.....
Black walnut,	34,200	.46	71 81	2,456	10,200	24,000
Birch,	25,000	.34	14 00	350	25,000	.....
Loblolly pine,	17,000	.23	30 00	510	.....	17,000
Douglas fir,	14,400	.20	50 00	720	.....	14,400
Hemlock,	12,250	.17	28 16	345	10,000	2,250
Sugar maple,	11,500	.16	20 00	235	11,500	.....
Spruce,	10,000	.13	20 00	200	.....	10,000
Circassian walnut,	10,000	.13	183 00	1,830	.....	10,000
Red cedar,	5,000	.07	40 00	200	.....	5,000
Total,	7,416,353	100.00	\$26 09	\$193,466	7,333,703	82,650

PART III.

THE USES OF WOOD BY PENNSYLVANIA MANUFACTURERS.

The following list indicates the various uses of wood reported by Pennsylvania manufacturers. The collation comprises over 6,000 separate commodities, and is probably the most complete statement of this kind ever presented.

APPLEWOOD.

Handles, handsaw

Pipes, smoking

Screws, bookbinders

ASH, BLACK.

Baskets
Bats, baseball
Beams, plow
Bodies, sleigh
Boxes, comb
Boxes, knife
Boxes, salt
Boxes, tin plate
Box shooks
Cabinets, kitchen
Cabs, locomotive
Chairs, kitchen
Chests, ice
Commodore, interior
Cooperage stock
Covers, butter pail

Crating
Finish, boot
Frames, automobile bodies
Frames, carriage bodies
Frames, wagon bodies
Handles, garden trowel
Handles, hammer
Handles, hand drill
Handles, hoe
Handles, lawn mower
Handles, paint brush
Handles, rake
Handles, wheel hoe
Hoppers, vegetable
Moulding, picture
Pails, candy

Pews, church
Poles, plke
Poles, plow
Refrigerators
Seats, auto
Seats, carriage
Sides, cheese box
Slats, bed
Slats, trunk
Sleds, coaster
Tops, cheese box
Tubs, butter
Tubs, lard
Washboards, laundry
Wood pulleys

ASH, WHITE.

Bottoms, automobile seat
Automobile bodies
Axle beds, buggy
Axle beds, perch spring wagon
Axle beds, surrey
Back boards, piano
Backing, cases
Backs, automobile seats
Backs, hair brush
Backs, nail brush
Backs, scrubbing brush
Balusters (stair)
Base blocks, house interior trim
Base corners, house interior trim
Base board, house interior trim
Base moulding, house interior trim
Baskets, split
Bats, baseball
Batters, dumb waiter
Beams, dining room ceiling
Beams (elevator)
Beds, light delivery wagons
Belt panel, light delivery wagon bodies
Benches, mess (boat)
Benches, piano
Blocks, brake
Blocks, brush
Blocks, pulley
Blocks, tackle
Boards, drain
Bodies, automobile
Bodies, cart
Bodies, wheelbarrow
Book racks
Bottoms, washing machines
Bows, automobile
Bows, buggy top
Bows, carriage top
Bows, hay bed farm wagons
Bows, wagon tops
Boxes, creamery shipping
Boxes, roller sign, (electric cars)
Brackets, plate rail
Brackets, stair
Brushes

Bushel crates
Cabinets, filing, exterior
Cabinets, printer
Cabinets, special work
Cabinets, typewriter
Cabinets, interior, river craft
Cabinets, interior, ships
Cabinets, interior, yachts
Cabs, locomotive
Carpet strip, house interior trim
Cars, elevator
Cases, binnaele
Cases, ship chart
Cases, type
Casing, controller box, electric cars
Casing, door
Casing, pipe organ
Casing, window
Chair arms, railway cars
Chair bottoms
Chair rail, house interior trim
Churn parts
Cleats, dumb waiter
Coaming, motor boat
Colonnades, house interior trim
Consoles
Corner blocks, house interior trim
Corner posts, light delivery wagons
Costumers
Counter tops, bar room
Covers, hatchway (ship)
Covers, switch boxes (electric cars)
Cues, billiard
Cupboard doors, railway cars
Decking, canoe
Doors
Doors, dumb waiter shaft
Doors, folding
Doors, locker (boat and ship)
Doors, sliding
Drain boards
Drop gate, light delivery wagon bodies
Dumb waiters
Dumb waiter parts

Dust guards (railway passenger cars)
Elevators, grain
Eveners
Facing, window partition (electric cars)
Felloes, heavy vehicle wheels
Felloes, light delivery wagons
Fifth wheel bars, light delivery wagons
Fifth wheel circles, light delivery wagons
Fifth wheel spools, light delivery wagons
Fillers, Scotch bame
Fillet, house interior trim
Finish, interior engine cab
Finish, yacht cabins
Fixtures, office, exterior
Flat battens, house interior trim
Flooring
Flooring, freight car platform scales
Flooring, freight elevators
Flooring, (passenger elevator cars)
Frames, automobile bodies
Frames, bob sleds
Frames, chair
Frames, coal screens
Frames (elevator cars)
Frames, gravel screens
Frames, sand shaking screens
Frames, tennis racket
Framework, automobile cushion
Front panels, light delivery wagons
Grilles (ship and boat cabins)
Guide posts, dumb waiter
Handles, bottom pick
Handles, brush
Handles, clay pick
Handles, coal pick
Handles, collier shovel
Handles, cultivator
Handles, garden hoe
Handles, garden rake
Handles, hay knife
Handles, jack screw

ASH, WHITE—Continued.

Handles, lawn mower	Novelties	Sides, wagon bodies
Handles, lawn rake	Nosing, house interior trim	Side futchels, light delivery wagons
Handles, manure fork	Oars, row boat	Side slats, light delivery wagons
Handles, mining pick	Panels, automobile bodies	Signal blades, railroad
Handles, paint brushes	Panels, ceiling (railway cars)	Sills, automobile
Handles, piano	Panels, door	Sills, buggy
Handles, pick	Panels, wagon bodies	Sills, buggy bodies
Handles, pitch fork	Panels, windows, railway cars	Sills, carriage
Handles, scoop	Panel strips, interior house trim	Sills, carriage bodies
Handles, shovel	Panel wainscoting, railway cars	Sills, delivery wagons
Handles, spade	Paper pulp	Sills, light delivery wagons
Handles, special brushes	Parts, flour mill machinery	Sills, inside window (electric cars)
Handles, varnish brushes	Piano cases, veneer	Sills, window, inside (railway cars)
Hay beds, farm wagon	Plasters, piano	Slat (automobile tops)
Hay bed blocks, farm wagon	Pillars, light delivery wagon	Slat, bed
Head blocks, house interior trim	Pilot wheels, river craft	Slat, trunk
Head casing, house interior trim	Pilot wheels, ship	Slat, wagon top
Heading, nail keg	Pole futchels, light delivery wagons	Sleds
Heading, slack cooperage	Planks, fish	Sleds, frame work
Heel board, light delivery wagons	Planks, steak	Sleds, toy
Hind spring bars, light delivery wagons	Plate rail, dining room	Splinter bars, light delivery wagons
Horses, rocking	Pole futchels, light delivery wagons	Spokes, automobile wheels
Hounds, light delivery wagon	Posts, chair	Spokes, heavy vehicle wheels
Hubs, wheelbarrow	Posts, piano	Spokes, light delivery wagons
Key bottoms, piano	Posts, warehouse trucks	Spokes, push cart wheels
Keels, motor boat	Push carts (bodies)	Spring yokes, light delivery wagons
Knees, canal boat	Racks, display	Staffs, flag
Knees, river craft	Racks, magazine	Stakes, log cars
Knees, ship	Rails, doors	Stands, umbrella
Knees, yacht	Rails, guide (dumb waiter)	Staves, butter pall
Knobs, door	Rails, river craft	Staves, slack cooperage
Ladders, hay	Rails, ship	Staves, tight cooperage
Ladders, river craft	Rails, stair	Staves, washing machine
Ladders, ship	Rails, yacht	Stay bars, light delivery wagons
Ladders, step	Reaches, buggy	Stays, boat
Lagging, refrigerator machine cylinders	Reaches, farm wagon	Stems, canoe
Lagging	Reaches, lumber wagon	Stems, motor boat
Lath	Reaches, perch spring wagon	Stems, river craft
Legs, billiard tables	Reaches, surrey	Stems, ships
Lining, cases	Reaches, wagon	Stems, yachts
Lower head blocks, light delivery wagons	Rear end posts, light delivery wagons	Stern posts, motor boat
Lower panels, light delivery wagon bodies	Refrigerators	Stiles, door
Jacks, wagon	Refrigerators, exterior	Stops, door, house interior trim
Jamb, door	Ribs, boat	Stops, drawer
Interior finish	Ribs, canoe	Stretchers, curtain
Interior finish, electric cars	Ribs, motor boat	Strips (elevator cars)
Interior finish, house	Rims, automobile wheels	Strips, guide (elevator)
Interior finish, (railway cars)	Rims, carriage wheels	Swing cleats, curtain pole
Interior finish, traction engine cabs	Risers, stair	Tables, sewing
Mantels	Rockers, chair	Tables, telephone
Milk counters, dairymans	Rollers	Tillers, canal boat
Mirror doors, house	Rollers, caster	Tillers, river craft
Moulding, automobile	Rosettes, wall (stairway)	Top rails, light delivery wagon bodies
Moulding, bed, house construction	Rounds, ladder	Top slats, light delivery wagon bodies
Moulding, cap, house interior trim	Rounds, ladder	Tops, washing machines
Moulding, cove, house interior trim	Rungs, ladder	Treads, stair
Moulding, crown, house construction	Runners, bob sled	Tripods, camera
Moulding, picture	Running boards, automobile	Upper head blocks, light delivery wagon
Moulding, plaster, house interior trim	Saddle trees	Veneer
Moulding, quarter round, house interior trim	Sash, electric cars	Wainscot rail, house interior trim
Moulding, spring cove, house construction	Sash, railway cars	Wainscoting, house interior trim
Neck yokes	Seat boards, light delivery wagons	Wainscoting cap, house interior trim
Newel posts, angle	Seat frames, canoe	Window apron, house interior trim
Newel posts, starting	Shackle bars, light delivery wagons	Window stool, house interior trim
	Shafts, light vehicles	
	Shelves, dumb waiter	
	Shoe rails (stair)	
	Showcases, exterior	
	Sides, billiard tables	
	Sides, push cart	
	Sides, truck	
	Side pillars, light delivery wagons	

ASPEN.

Excelsior

BASSWOOD.

Altars, church	Baskets, split	Bellows, organ
Animals, toy	Base blocks, house interior trim	Bellows frames, organ
Astragals, folding door	Base boards, house interior trim	Binding strips, school black-board
Astragals, sliding door	Base corners, house interior trim	Blinds, window
Backing, mirror	Base moulding, house interior trim	Blocks, brake
Backs, buffets	Beams, dining room ceiling	Blocks, brush
Backs, bureaus	Bedsteads, hidden work	Blocks, tassel
Backs, chiffoniers		Blowers, organ
Backs, mirror		

BASSWOOD—Continued.

Blowers, player piano	Feet, piano	Pails, candy
Boards, ironing	Fillet, house interior trim	Panel strips, house interior trim
Boards, pastry	Flag sticks (railway)	Panels, door
Boards, potato chip	Flat battens, house interior trim	Paper pulp
Boards, potato peeler	Flooring	Parting strip, house interior trim
Boards, skirt	Frames, corn graders	Partition moulds, house interior trim
Boards, slaw	Frames, front door side light	Pedal boards, piano cases
Boats, toy	Frames, jewelry case	Pews, church
Bodies, baby carriage	Frames, lounge	Pianos, toy
Bottom panels, piano cases	Frames, mirror	Plasters, piano cases
Bottom rails, sash	Frames, picture	Pipes, organ
Bottoms, buffets	Frames, store fixture	Plate rail, dining room
Bottoms, case	Frames, suit case	Racks, curtain display
Bottoms, chiffonier	Front doors, house	Racks, rug display
Bottoms, dressers	Game boards	Rails, door
Bottoms, grape basket	Grain registers, threshers	Rails, table
Boxes, bottle	Grilles, house interior trim	Reels, electric wire
Boxes, candy	Handles, broom	Reels, solder wire
Boxes, knife	Handles, brush	Refrigerators
Boxes, novelty	Handles, long handled dust brush	Rims, split wood pulleys
Boxes, packing	Handles, mop	Sash, window
Boxes, shirtwaist	Handles, pipe	Seats, automobile
Boxes, trunk	Handles, plastering trowel	Seats, chair
Boxes, toy	Handles, street brushes	Seats, tricycle
Brackets, plate rail	Handles, wall brush	Serving tables, hidden work
Brake blocks, mine pit wagon	Handles, window brush	Shelving
Bushel crates	Head blocks, house interior trim	Sideboards, interior work
Capping, sink, house interior trim	Head casing, house interior trim	Sides, piano cases
Carpet strip, house interior trim	Heading, nail keg	Sides, toy wagons
Carts, dump	Heading, slack cooperage	Sides, wagon bodies
Carvings, wood	Interior finish, churches	Sides, wheelbarrow
Cases, clock	Interior frames, store fixtures	Siding, house
Cases, sample	Ironing boards, folding	Sink aprons, house interior trim
Cases, silverware	Jamb, door	Slat, automobile tops
Cases, type	Key blocks, piano cases	Slat, wagon tops
Casing, door	Key bottoms, piano cases	Spouting, flour mill
Casing, house	Key slips, piano cases	Stands, bible
Casing, window	Ladders, step	Staves, slack cooperage
Ceiling	Lath	Staves, tight cooperage
Chair rail, house interior trim	Lids, grape basket	Step ladders
Cheeks, piano case	Mantels	Sticks, umbrella
China closet, interior	Mantels, painted work	Stiles, door
Clog soles (shoe)	Meeting rail, sash	Stops, door, house interior trim
Clothes driers	Mirror doors, house	Stops, window, house interior trim
Coal boxes, traction engine	Molding, bed, house construction	Stretchers, curtain
Colonnades, house interior trim	Molding, brick, house construction	Strips, felt bound school slates
Communication rails, church	Molding, cap, house interior trim	Tables
Consoles	Molding, casket	Tables, ironing
Corner blocks, house interior trim	Molding, cove	Templates, shipbuilding
Crates	Molding, crown, house interior trim	Top panels, piano cases
Crating	Molding, drip cap, house construction	Top rails, sash
Cups, soap	Molding, electric wire	Top slats, light delivery wagon bodies
Curtain stretchers	Molding, piano cases	Tops, kitchen table
Display forms, hosiery	Molding, picture	Tops, piano cases
Display forms, shoe	Molding, plaster, house construction	Tops, table
Doll parts	Molding, quarter round	Toy pianos
Doors	Molding, spring cove, house construction	Trays, incubator
Doors, folding	Molds, butter	Trays, trunk
Doors, sliding	Mud shields, traction engine	Trunks
Dowels	Mullions, sash	Veneer
Dust cap, house interior trim	Music shelf, piano cases	Wainscot rail, house interior trim
Dust conveyors, threshing machine	Nosing, house interior trim	Wainscoting cap, house interior trim
Dust guards, freight car axles	Novelties	Wheelbarrows, toy
Dust guards, railway cars	Novelties, burnt wood	Window apron, house interior trim
Elevators, flour mill		Window stool, house interior trim
Excelsior		
Excelsior, packing		
Excelsior, ribbon (mattress stuffing)		
Fall boards, piano cases		

BEECH.

Acetate of lime	Baskets, split	Bottoms, fruit baskets
Alcohol, wood	Bay brackets, house construction	Bottoms, jack plane
Astragals, folding door	Beams, dining room ceiling	Bottoms, wagon bodies
Astragals, sliding door	Blocks, brake	Boxes, comb
Back posts, piano	Blocks, brush	Boxes, foundry moulding
Backing, desk	Boards, bosom	Boxes, knife
Backs, chair	Boards, bread	Boxes, packing
Backs, drawer	Boards, lap	Boxes, plate glass packing
Balusters, porch	Boards, pastry	Boxes, salt
Base blocks, house interior trim	Book shelves	Boxes, tin plate
Base board, house interior trim	Bottom panels, piano cases	Brackets, mine
Base corners, house interior trim	Bottom rail, porch	Brackets, plate rail
	Bottom rails, sash	Brackets, porch
	Bottoms, basket	Brooms, street
	Bottoms, carriage bodies	Capping, sink, house interior trim

BEECH—Continued.

Carpet strip, house interior trim
Cases, blacking
Cases, shipping
Casing, door
Casing, window
Celery crates
Center arms, split wood pulleys
Chair rail, house interior trim
Chairs, childrens'
Chairs, folding camp
Chairs, ladder
Charcoal
Cheeks, piano case
Chips, brewers
Chopping bowls
Clamps, trouser hanger
Clothes driers
Colonnades, house interior trim
Commodes
Consoles
Corner blocks, house interior trim
Costumers
Cots, camp
Crating
Cresting, porch roof
Cross-ties, railroad
Door boards, coal car
Door boards, railway grain car
Doors, folding
Doors, sliding
Dowels
Dust cap, house interior trim
End sills, log cars
Face brackets, house construction
Fall boards, piano cases
Feet, piano
Felloes, wheelbarrow wheel
Fillet, house interior trim
Fixtures, curtain
Flat battens, house interior trim
Flooring, house
Flooring, mine dump cars
Frame work, farm machinery
Frames, buck saw
Frames, corn sheller
Frames, door
Frames, front door side light
Frames, light vehicles
Frames, school slate
Frames, window
Frieze rail, porch
Front doors, house
Furniture, camp
Gable brackets, house construction
Gable ornaments, house construction
Grilles, house interior trim
Handles, awl
Handles, boning knife
Handles, broom
Handles, butcher knives
Handles, carpenter try-square
Handles, coal sieve
Handles, crosscut saw

Handles, fruit baskets
Handles, lawn rake
Handles, long handled dirt pans
Handles, plane
Handles, skinning knives
Handles, steak knife
Handles, sticking knife
Handles, wheelbarrow
Handles, whip
Hangers, clothes
Hangers, garment
Head blocks, house interior trim
Head casing, house interior trim
Heading, cooperage
Heading, nail keg
Heading, slack cooperage
Hubs, wheelbarrow
Interior finish, freight cars
Jambs, door
Key blocks, piano case
Key bottoms, piano cases
Key slips, piano cases
Lath
Legs, table
Legs, ironing board
Mantels
Medicine cabinets
Mine props
Meeting rails, sash
Mirror doors, house
Moulding, bed, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction
Moulding, picture
Moulding, piano case
Moulding, plaster, house construction
Moulding, quarter round
Moulding, spring cove, house construction
Mullions, sash
Music shelf, piano case
Nosing, house interior trim
Novelties
Panel strips, house interior trim
Pancs, door
Paper pulp
Parasol sticks
Partition moulds, house interior trim
Parts, bookbinders machinery
Pedal boards, piano cases
Pilasters, piano cases
Pins, cartridge
Pins, clothes
Pipe, wooden water
Planes, moulding
Plate rail, dining room
Poles, curtain
Porch columns, built up
Porch newels, built up
Porch spandrels

Posts, chair
Posts, dresser
Rails, bed
Rails, door
Rails, kitchen table
Reels, hose
Refrigerators, exterior
Rims, fruit baskets
Rounds, chair
Ruling machines, bookbinders
Rungs, ladder
Screens, door
Screens, window
Scroll sawed balusters, porch
Seats, buggy
Seats, lawn swings
Sides, cheese box
Sides, drawer
Sides, mine dump cars
Sides, piano case
Sides, step ladder
Sink aprons, house interior trim
Slat, ash can
Slat, lawn swings
Slides, table
Spindles, porch
Sprags, mine
Staffs, flag
Staves, cement barrel
Staves, cooperage
Staves, slack cooperage
Step ladder chairs
Steps, step ladder
Sticks, flower
Sticks, umbrella
Stiles, door
Stools, camp
Stops, door, house interior trim
Stops, window, house interior trim
Tabourettes
Tongues, toy wagon
Top panels, piano case
Top rail, porch
Top rails, sash
Tops, kitchen table
Tops, piano cases
Tops, sleds
Toy express wagons
Toy furniture
Toy tops
Traps, game
Traps, mouse
Traps, rat
Veneer
Wainscot, rail, house interior trim
Wainscoting cap, house interior trim
Walkers, baby
Wedges, mine cap
Wheelbarrows
Window apron, house interior trim
Window stool, house interior trim
Wire cloth display racks

BIRCH, BLACK.

Benches, piano
Cabinets, medicine
Costumers

End sills, log car
Felloes, heavy vehicle wheels
Handles, butcher knives

BIRCH, PAPER.

Backing, cabinet
Backs, brush
Baskets
Blocks, brush
Bobbins
Boxes, druggists'
Chair frames, rattan
Chairs, turned parts
Clothespins
Excelsior
Handles, brush
Handles, carrying
Handles, edge tools

Handles, engravers tools
Handles, file
Handles, nail
Hubs, toy wagon
Hubs, toy wheelbarrow
Knobs
Knobs, drawer
Moulding, piano
Novelties
Organ parts
Plugs, paper
Poles, rug
Rollers, curtain

Rollers, lawn mower
Shelving, cabinet
Spindles, chair
Spools
Spoons, ribbon
Spoons, wooden
Sticks, candy
Toothpicks
Toys
Turnings
Wheels, toy wagon
Wood wool

BIRCH, SWEET.

Acetate of lime
Alcohol, wood
Arms, chair
Astragals, folding door
Astragals, sliding door
Axles, farm wagon
Backs, chair
Back posts, chair
Back posts, piano
Backing, postoffice furniture
Backing, desk
Balusters, stair
Base blocks, house interior trim
Base board, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Baskets
Baskets, fruit and vegetable
Baskets, split
Beams, dining room ceiling
Beds, folding
Benches, piano
Blocks, brake
Blocks, brush
Boards, meat
Boards, potato chip
Boards, saw
Boat parts, row
Bodies, light vehicle
Bookcases, exterior
Bookcases, interior
Bookracks
Bottom panels, piano cases
Bottoms, automobile seat
Bottoms, carriage bodies
Bottoms, heavy vehicle bodies
Bottoms, wagon
Bottoms, wagon body
Box shooks
Boxes
Boxes, cheese
Boxes, comb
Boxes, glove
Boxes, knife
Boxes, packing
Boxes, plate glass packing
Boxes, salt
Boxes, telephone
Boxes, veneer
Boxes, veneered
Bowls, chopping
Brackets
Brackets, mine
Brackets, plate rail
Brackets, stair
Brackets, wall (stair)
Bread boards
Buffets, bar room
Bureaus, exterior
Cabinet work
Cabinet work, passenger cars
Cabinets
Cabinets, medicine
Cabinets, music
Cabinets, parlor
Cabinets, phonograph
Cabinets, toilet
Cabins, interior, yachts
Cabins, interior, ships
Cabins, interior, river craft
Capitals
Carpet strip, house interior trim
Cars, elevator
Cases, blacking
Cases, clock
Cases, medicine
Cases, organ
Cases, piano
Cases, railroad tickets
Cases, shipping
Cases, wall
Cases, water closet tanks
Casing
Casing, door
Casing, window
Caskets
Chair rail, house interior trim
Chairs
Chairs, adjustable
Chairs, barber
Chairs, dining room
Chairs, office
Charcoal

Cheeks, piano case
China closets
Clamps, trouser hanger
Coffins
Colonnades, house interior trim
Columns, porch
Commodes
Consoles
Cores, veneer
Corner blocks, house interior trim
Cornice, house construction
Costumers
Couches
Counter tops, bar room
Counters, bar
Counters, office
Counters, store
Cradles
Crating
Cutting boards, meat
Davenport
Decking, canoe
Division boards, collapsible crates
Doors
Doors, folding
Doors, sliding
Dowels
Dowels, parasol
Drawers, post-office furniture
Dressers
Dressing tables, exterior
Dust cap, house interior trim
Exterior finish, house
Fall boards, piano cases
Feet, piano
Fillet, house interior trim
Fixtures, bar room
Fixtures, barber shop
Fixtures, curtain
Fixtures, laboratory
Fixtures, office
Fixtures, soda fountain
Fixtures, store
Flat battens, house interior trim
Flooring
Flooring, house
Flooring, inlaid
Flooring, mine dump cars
Frame work, farm machinery
Frames, chair
Frames, cheval mirror
Frames, davenport
Frames, door
Frames, front door side lights
Frames, light vehicle bodies
Frames, light vehicle seat
Frames, lounge
Frames, parlor furniture
Frames, roller towel
Frames, sofa
Frames, upholstered furniture
Furniture, case goods
Game boards
Gear parts, light vehicles
Grille work
Grilles
Grilles, house interior trim
Hall racks
Handles, coal sieve
Handles, file
Handles, hoe
Handles, lawn rake
Handles, rake
Handles, saw
Handles, screw wrenches
Handrails, porch
Handrails, stair
Head blocks, house interior trim
Head casing, house interior trim
Heading, cement barrels
Heading, cooperage
Heading, slack cooperage
Interior finish
Interior finish, freight cars
Interior finish, house
Jambs, door
Key blocks, piano cases
Key bottoms, piano cases
Key slips, piano case
Keys, organ
Keys, piano

Ladders, exterior
Ladders, step
Lath
Launch parts
Leaves, table
Leg, table
Lining, motor boats
Lounges
Mantels
Medicine cabinets
Mirror doors, house
Moulding, bed, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction
Mouldings, piano
Mouldings, piano case
Moulding, picture
Moulding, plaster, house construction
Moulding, quarter round
Moulding, spring cove, house construction
Moulds, butter
Mullions, sash
Music cabinets
Music shelf, piano cases
Newel posts, angle
Newel posts, starting
Nosing, house interior trim
Novelties
Organ cases, exterior pipe
Ornaments, furniture
Panel strips, house interior trim
Panel work, show windows
Panels
Panels, stair work
Panels, veneered
Paper pulp
Parquetry flooring
Partitions, office
Partitions, post office letter racks
Partitions, store
Parts, row boat
Passenger cars, interior finish
Patterns, machine
Pedal boards, piano cases
Pedestals
Pen racks
Pilasters
Pilasters, piano cases
Pillars, chair
Pins, cartridge
Pins, clothes
Pipe, wooden water
Pipes, (imitation calabash)
Plate rail, dining room
Poles, curtain
Racks, book
Racks, display
Racks, key
Rails, stair
Reels, fence wire
Refrigerators
Rims, split wood pulleys
Risers, stair
Rockers, chair
Rollers, towel
Rosettes, wall (stairway)
Rough horses, stair
Rounds, chair
Ruling machines, bookbinders
Rungs, chair
Sash
Seat frames, canoe
Screens, door
Screens, window
Seats, chair
Seats, water closet
Sewing machine parts
Shelves, book
Shoe rails, stair
Showcase
Sideboards, exterior
Sides, bookcase
Sides, cheese boxes
Sides, china closet
Sides, desks
Sides, dressers

BIRCH, SWEET—Continued.

Sides, mine dump cars
Sides, piano cases
Sills, cart
Sink mats
Slats, bed
Slides, table
Somnols
Spindles, chair
Spools, electric wire
Sprags, mine
Staffs, flag
Staves, cement barrels
Staves, cooperage
Staves, slack cooperage
Sticks, flower
Stools, foot
Stools, office
Stools, piano
Stops, door, house interior trim
Store fronts

Stretchers, chair
String boards, stair
Swings, lawn
Switchboards, telephone
Tables
Tables, billiard
Tables, library
Tables, pool
Tables, sewing
Tabourettes
Tool chests
Top panels, piano cases
Top slats, light delivery wagon
bodies
Tops, case goods
Tops, piano cases
Tops, post office furniture
Tops, table
Toy chairs
Toy furniture

Toy tops
Trays, pen
Treads, stair
Veneer
Veneer cores, piano cases
Wagon boxes
Wagons
Wainscoting
Wainscoting cap, house interior trim
Wainscot rail, house interior trim
Wardrobes
Wardrobes, exterior
Wedges, mine cap
Window apron, house interior trim
Window stool, house interior trim

BIRCH, YELLOW

Balls, croquet
Blinds
Blocks, brush
Boards, chopping
Robbins
Boxes, butter
Boxes, packing
Boxes, tinware
Cabinets, kitchen
Chair arms, railway cars
Chairs, folding
Chairs, kitchen
Controller box casing, electric cars
Costumers
Covers, switch boxes, electric cars
Crates, tinware
Crating
Cupboard doors, railway cars
Dairy accessories

Dishes, butter
Facing, window partition
Handles, broom
Handles, dust brush
Handles, wrench
Heads, spool
Horses, clothes
Implements, agricultural
Interior finish, electric cars
Interior finish, railway cars
Interior finish, railway coaches
Mallets, croquet
Middles, spool
Mills, coffee
Mirrors, hand
Moulds, butter
Novelties
Panel wainscoting, railway cars
Panels, ceiling, railway cars
Panels, window, railway cars

Pins, clothes
Plates, pie
Prints, butter
Sash, electric cars
Sash, railway cars
Screens, door
Screens, window
Seats, chair
Sills, inside window (electric cars)
Sills, window, inside (railway cars)
Sleds
Spools
Tables, kitchen
Tennins, toy
Toy furniture
Toy tops
Toys
Turnings

BOXWOOD

Boxes, comb
Engravings, wood
Handles, umbrella

Handles, shaving brush
Quoins, printers'
Rules, carpenters'

Scales, draftmen's
Shuttles
Type measures, printers'

BRIAR ROOT

Pipes, smoking

BUCKEYE, OHIO

Balusters, porch
Base blocks, house interior trim
Base board, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Bay brackets, house construction
Beams, dining room ceiling
Blind stop, house construction
Boards, ironing
Boards, pastry
Boards, sleeve
Bottom rail, porch
Boxes, packing
Brackets, plate rail
Brackets, porch
Capping, sink, house interior trim
Carpet strip, house interior trim
Casing, door
Casing, window
Chair rail, house interior trim
Colonnades, house interior trim
Corner blocks, house interior trim
Cresting, porch roof
Doors, folding
Doors, sliding
Dust cap, house interior trim
Face brackets, house construction
Fillet, house interior trim

Flat battens, house interior trim
Frames, door
Frames, front door side lights
Frames, window
Frieze rail, porch
Front doors, house
Gable brackets, house construction
Gable ornaments, house construction
Grilles, house interior trim
Head blocks, house interior trim
Head casing, house interior trim
Jambs, door
Mantels
Mirror doors, house
Moulding, bed, house construction
Moulding, brick, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction
Moulding, picture
Moulding, plaster, house construction
Moulding, quarter round

Moulding, screw
Moulding, sprung cove, house construction
Nosing, house interior trim
Panel strips, house interior trim
Parting stop, house interior trim
Partition moulds, house interior trim
Plate rail, dining room
Porch columns, built up
Porch columns, solid
Porch newels, built up
Porch newels, solid
Porch spandrels
Racks, clothes
Racks, towel
Scroll sawed balusters, porch
Siding, house
Sink aprons, house interior trim
Slide, fly screen
Spindles, porch
Stops, door, house interior trim
Stops, window, house interior trim
Top rail, porch
Wainscot rail, house interior trim
Wainscoting cap, house interior trim
Window apron, house interior trim
Window stool, house interior trim

BUTTERNUT

Base blocks, house interior trim
Baseboard, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Beams, dining room ceiling
Brackets, plate rail
Capping, sink, house interior trim
Carpet strip, house interior trim
Casing, door
Chair rail, house interior trim
Chests, clothes
Chests, flour
Colonnades, house interior trim
Corner blocks, house interior trim
Doors, folding
Doors, sliding
Drain boards, sink
Dust cap, house interior trim
Excelsior, packing

Excelsior ribbon (mattress stuffing)
Fillet, house interior trim
Finish, boats
Flat battens, house interior trim
Frames, door
Front doors, house
Grilles, house interior trim
Head blocks, house interior trim
Head casing, house interior trim
Interior finish
Jambs, door
Mantels
Moulding
Moulding, bed, house interior trim
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction

Mirror doors, house
Moulding, drip cap, house construction
Moulding, picture
Moulding, quarter round
Moulding, sprung cove, house construction
Nosing, house interior trim
Panel strips, house interior trim
Paper pulp
Patterns, foundry
Plate rail, dining room
Rims, split wood pulleys
Ship furniture
Sink aprons, house interior trim
Wainscoting cap, house interior trim
Wainscot rail, house interior trim
Window apron, house interior trim
Window stool, house interior trim

CEDAR, RED

Benches, porch
Benches, rustic lawn
Box shooks
Boxes, fuel
Butter workers, dairymen's
Cabinets, parlor
Cases, casket
Cases, coffins
Caskets
Chests, clothes

Churns, butter
Coffins
Cross arms, telegraph pole
Cross ties, railroad
Faucets, oil barrel
Frames, couch
Frames, davenport
Frames, lounges
Frames, upholstered furniture
Handles, paint brushes
Handles, varnish brushes

Lining, closets
Lining, clothes closets
Pencils
Pergolas
Posts, fence
Shingles
Siding, house
Silos
Summer houses
Tanks
Vats

CEDAR, SPANISH

Cigar boxes
Decking, motor boat
Floor boards, rowboat (round bottom)
Handles, tennis racket

Hulls, boats
Hulls, canoes
Hulls, racing shells
Planking, canoe

Planking, rowboats (flat bottom)
Ribs, canoe
Veneer

CEDAR, WESTERN RED

Cabinet work
Caskets
Ceiling
Cornice work

Fixtures, office
Flooring, porch
Frames, screen door
Frames, window screen

Shingles
Siding
Silos
Tanks, windmill

CEDAR, WHITE

Boat boards
Boat siding
Boats, motor
Boats, superstructure
Box shooks
Canoes
Decking, motor boat
Finish, interior
Furniture

Hulls, boat
Hulls, canoes
Hulls, racing shells
Pickets, wire fence
Planking, canoe
Planking, boat
Planking, motor boat
Planking, yacht

Ribs, canoe
Siding, canoe
Siding, launch
Silos
Tanks
Tanks, paper mill
Tubs, washing machine
Vats

CEIBA

Shuttles

CHERRY

Acetate of lime
Actions (organs)
Alcohol, wood
Backing, electrotpe
Backs, clothes brush
Backs, drawer
Backs, hairbrush
Backs, nail brush
Balusters (stair)
Balusters, stairway
Base blocks, house interior trim
Baseboards
Baseboard, house interior trim
Base corners, house interior trim
Base moulding, house interior trim

Beams, dining room ceiling
Blinds, venetian
Blocks, brush
Booths, telephone
Boxes, plate glass packing
Boxes, roller sign (electric cars)
Boxes, sewing
Boxes, veneer
Brackets, plate rail
Brackets, stair
Brackets, stairway
Brushes
Bureaus, exterior
Cabinet work
Cabinet work, boat
Cabinet work (electric cars)
Cabinet work (Pullman cars)

Carpet strip, house interior trim
Carvings, wood
Cases, dental
Cases, optical
Cases, wall
Cases, water closet tank
Casing, door
Casing, window
Casings
Caskets
Chair arms, Pullman coaches
Chair rail, house interior trim
Charcoal
Chiffoniers
Coffins
Colonnades, house interior trim
Colonnades, Pullman coaches

CHERRY—Continued

Commodore	Head blocks, house interior trim	Panels, window (Pullman coaches)
Consoles	Head casing, house interior trim	Paper pulp
Corner blocks, house interior trim	Heading, nail keg	Partitions, office
Counters, bar	Interior finish	Partitions, store
Counters, store	Interior finish (camera)	Parts, automobile bodies
Covers, switch boxes (electric cars)	Interior finish, electric cars	Patterns
Covers, switch box (Pullman coaches)	Interior finish, Pullman coaches	Patterns, foundry
Cupboard doors, Pullman coaches	Interior trim, house	Peel blades, bakers'
Dashboards, automobile	Jamb, door	Pipes, organ
Deck trimmings, motor boat	Levels, carpenters'	Plate rail, dining room
Doors	Lids, water closet	Platforms, counter scales
Doors, folding	Linings, boat	Poison cases (drug store)
Doors, sliding	Lunch tables, portable (Pullman coaches)	Press boards, bookbinders'
Doors, upper berth, sleeping cars	Mantels	Push button frames (Pullman coaches)
Drawer parts, office fixtures	Mantels, soda fountain	Rails, door
Drawer parts, store fixtures	Mirror doors, house	Rails, stair
Dust cap, house interior trim	Mirror frames, passenger elevator cars	Rails, table
Facing, window partition (electric cars)	Mirror frames, Pullman coaches	Range finders, camera
Files, newspaper	Models	Refrigerators, soda fountain
Fillet, house interior trim	Models, machine	Risers, stairway
Finish, interior (automobile bodies)	Moulding, bed, house construction	Ruling machines, bookbinders'
Fixtures, bank	Moulding, cap, house interior trim	Sash
Fixtures, bar	Moulding, cove	Sash, automobile
Fixtures, barber shop	Moulding, crown, house construction	Sash, electric cars
Fixtures, office	Moulding, drip cap, house construction	Sash, Pullman coaches
Fixtures, store	Moulding, plaster, house construction	Seats, water closet
Fixtures (store display)	Moulding, quarter round	Seats, wire frame chairs
Fixtures, window display	Moulding, spring cove, house construction	Show cases
Flat battens, house interior trim	Moulding, quarter round	Sides, drawer
Flooring	Moulding, spring cove, house construction	Sills, inside window (electric cars)
Flooring, parquet	Moulds, fire brick	Slides, drawer
Foot rails (stair)	Mountings, electrotype	Squares, draftsman
Foot rail, stairway	Newel posts, angle	Stands, city directory
Frames, door	Newel posts, starting	Stiles, door
Frames, mirror	Nosing, house interior trim	Stops, door, house interior trim
Frames, picture	Organs, cabinet	Tops, counter
Furniture, bank	Organs, pipe	Tops, table
Furniture (barroom)	Panel strips, house interior trim	Tops, wire frame tables
Furniture, barber shop	Panel wainscoting, Pullman coaches	Track sections, camera
Furniture, drug store	Panel work, office partitions	Treads, stair
Furniture (office)	Panel work, store fixtures	Triangles (billiard)
Furniture, store	Panels, ceilings (Pullman coaches)	Triangles, draftsman
Grilles	Panels, door	Veneer
Grilles, house interior trim	Panels, passenger elevator cars	Wainscot rail, house interior trim
Grilles, Pullman coaches		Wainscoting cap, house interior trim
Hand rail, stairway		Window apron, house interior trim
Handles, reciprocating drills		Window stool, house interior trim
Handles, varnish brushes		

CHERRY, WILD

Paper pulp

CHESTNUT

Astragals, folding door	Boxes, clothiers'	Chairs, arm
Astragals, sliding door	Boxes, coal sieve	Chairs, desk
Backs, brush	Boxes, packing	Chairs, mission
Backing, bureau	Boxes, plant	Chairs, rocking
Backing, desk	Boxes, tin plate	Chests, hall
Backing, dresser	Boxes	Chiffoniers
Backing, furniture	Boxing	China cases, shelving
Backing, sideboards	Brackets, plate rail	Coffins
Backing, washstand	Brackets, stair	Colonnades, house interior trim
Backs, piano	Buffets, exterior	Columns, china closet
Balusters (stair)	Bureaus, hidden work	Columns, sideboard
Base blocks, house interior trim	Bureaus, exterior	Commodore
Baseboards	Bushel crates	Consoles
Baseboard, house interior trim	Cabinets, magazine	Cores, door
Base corners, house interior trim	Cabinets, scale	Cores, veneering
Base moulding, house interior trim	Cabinets, smokers	Corner blocks, house interior trim
Beams, dining room ceiling	Carpet strip, house interior trim	Couch frames
Beds, folding	Cars, passenger elevator	Counters, store
Bedsteads, exterior	Cases (casket)	Crates
Bedsteads, hidden work	Cases, medicine	Crating
Blinds, window	Cases, piano	Cross arms, telegraph pole
Bodles, toy wheelbarrows	Cases, veneer	Cross ties, railroad
Bookcases, sectional	Casing, door	Desks
Book racks, revolving	Casing, window	Doors
Booths, voting (exterior)	Caskets	Doors, folding
Bottoms, grape basket	Ceiling	Doors, sliding
Box ends, fertilizer sowers	Cellarettes	Drain boards, sink
Box shooks	Chair rail, house interior trim	Drawer fronts
	Chairs	Drawer sides
		Dressers

CHESTNUT—Continued

Dust cap, house interior trim	Moulding, cove	Shelves, book
Fillet, house interior trim	Moulding, crown, house construction	Shelves, piano
Fixtures, bank	Moulding, picture	Shingles
Fixtures, bar	Moulding, plaster, house interior trim	Showcase
Fixtures, barber shop	Moulding, quarter round	Sideboards
Flasks, foundry	Moulding, spring cove, house construction	Sideboards, built in
Flat battens, house interior trim	Moulding, stair	Sideboards, exterior
Flooring	Newel posts, angle	Sides, billiard tables
Flooring, porch	Newel posts, starting	Siding, house
Foot rests	Nosing, house interior trim	Sides, piano cases
Footstools	Outer cases	Siding, plate glass shipping cases
Frames, coal sieves	Panel cases, veneer doors	Slats, trunk
Frames, furniture	Panel strips, house interior trim	Sofas, exterior
Frames, lounge	Panels, organ case	Stands, plant
Frames, mirror	Panels (piano cases)	Staves, cement barrels
Frames, office fixtures	Panels, veneer	Staves, slack cooperage
Frames, picture	Partitions	Staves, tight cooperage
Frames, upholstered chairs	Partition moulds, house interior trim	Stops, door, house interior trim
Frames, upholstered furniture	Parts, flour mill machinery	String boards (stair)
Front doors, house	Pickets, fence	Swell boxes, pipe organ
Furniture	Plate rail, dining room	Tables, dropleaf
Furniture, bed room	Posts, porch	Tables, extension
Furniture, mission	Rails, billiard tables	Tables, library
Furniture, office	Rails, china closet	Tables, tea
Grilles, house interior trim	Rails, shoe (stair)	Tool chests, toy
Hall mirror hatracks	Rails, stair	Top frames, piano
Head blocks, house interior trim	Refrigerators	Tops, piano
Head casing, house interior trim	Refrigerators, exterior	Tops, table
Heading, slack cooperage	Risers, stair	Toy furniture
Interior frames, office fixtures	Roller feeders, flour mill machinery	Toy tops
Interior finish, house	Rosettes, wall (stairway)	Treads, stair
Jamb, door	Screens, fire	Veneer
Keyboards, organ	Seats, chair	Veneer cores, piano cases
Keyboards, piano	Settees	Wainscot rail, house interior trim
Kitchen furniture	Settees	Wainscoting
Lath	Sewing machine parts	Wainscoting cap, house interior trim
Lids, grape basket	Sheathing	Washstands
Mantels	Sheathing, house	Washstands, exterior
Mirror doors, house		Window apron, house interior trim
Moulding, bed, house construction		Window stool, house interior trim
Moulding, cap, house interior trim		

COCOBOLO

Handles, butcher steel	Handles, hand wood drill	Handles, putty knife
Handles, carpenters' brace	Handles, palette knife	Handles, scraping knife
Handles, combination tool sets	Handles, paring knives	Heads, carpenter brace

CONGO

Handles, umbrella

COTTONWOOD

Balusters, porch	Brooders, poultry	Face brackets, house construction
Base blocks, house interior trim	Cabinets, inside work	Fillet, house interior trim
Baseboard, house interior trim	Cabinets, kitchen	Fixtures, barroom
Base corners, house interior trim	Capping, sink, house interior trim	Fixtures, office
Base moulding, house interior trim	Carpet strip, house interior trim	Fixtures, store
Baskets, berry	Cases, beer	Flat battens, house interior trim
Battens, O. G. barn	Cases, egg	Footstools
Bay brackets, house construction	Casing, door	Frames, box couches
	Casing, window	Frames, door
	Caskets	Frames, front door sidelight
Beams, dining room ceiling	Chair rail, house interior trim	Frames, upholstered furniture
Beds, manure spreaders	Cigar boxes	Frames, wood
Bevel siding, house	Cloth boards	Frieze rail, porch
Bins, curd grinding machines	Coffins	Front doors, house
Blind stop, house construction	Colonnades, house interior trim	Gable brackets, house construction
Boards, ironing	Commodore, interior	Gable ornaments, house construction
Boards, skirt	Consoles	Grilles, house interior trim
Boards, mortar	Cooperage, slack	Head blocks, house interior trim
Boards, pastry	Coops, poultry	Head casing, house interior trim
Bottom rail, porch	Corner blocks, house interior trim	Hoppers, curd grinding machines
Bottom rails, sash	Crates, berry	Incubators
Bottoms, drawer	Crates, milk bottle	Interior work, electric shoe shining machines
Bottoms, trunk	Crating	Jamb, door
Boxes, bottle	Crating, porch roof	Lath
Boxes, bottlers	Cupboards, kitchen	Lining, freight cars
Boxes, packing	Doors, folding	
Boxes, trunk	Doors, sliding	
Boxes, wheat drills	Dowels, chair	
Brackets, plate rail	Drawers, incubator	
Brackets, porch	Excelsior	

COTTONWOOD—Continued

Lining, wagon bodies
Mantels
Meeting rails, sash
Mirror doors, house
Moulding, bed, house construction
Moulding, brick, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction
Moulding, picture
Moulding, plaster, house construction
Moulding, quarter round
Moulding, screen
Moulding, spring cove, house construction
Mullions, sash
Nosing, house interior trim
Packages, fruit
Packing cases, plate glass
Panels, agricultural machinery

Panels, door
Panels, light vehicle bodies
Panels, light vehicle seats
Panels, spring wagon bodies
Panel strips, house interior trim
Panels, threshing machine
Parting stop, house interior trim
Partition molds, house interior trim
Parts, door
Parts, flour mill machinery
Plate rail, dining room
Porch columns, built up
Porch columns, solid
Porch newels, built up
Porch newels, solid
Porch spandrels
Roof slats, wagon bodies
Scroll sawed balusters, porch
Shredders, fodder
Shipping cases, butter
Slides, farm wagon bodies
Sink aprons, house interior trim

Slide, fly screen
Soil rollers
Spindles, porch
Stiles, door
Stops, door, house interior trim
Stops, window, house interior trim
Tables, kitchen
Top rail, porch
Top rails, sash
Tops, kitchen cabinets
Tops, kitchen table
Tops, trunk
Tops, veneered, trunks
Tray bottoms (trunk)
Wainscoting cap, house interior trim
Wainscot rail, house interior trim
Washboards, laundry
Window apron, house interior trim
Window stool, house interior trim
Wood pulleys

CUCUMBER

Base blocks, house interior trim
Baseboard, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Beds, spring wagon
Blind stop, house construction
Brackets, plate rail
Carpet strip, house interior trim
Casing, door
Casing, house
Casing, window
Chair rail, house interior trim
Colonnades, house interior trim
Corner blocks, house interior trim
Doors, folding
Doors, sliding

Dust cap, house interior trim
Fillet, house interior trim
Frames, door
Frames, window
Grilles, house interior trim
Head blocks, house interior trim
Jambs, door
Mantels
Mantels, painted work
Mirror doors, house
Moulding, bed, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction

Moulding, picture
Moulding, quarter round
Moulding, spring cove, house construction
Nosing, house interior trim
Paper pulp
Partition moulds, house interior trim
Plate rail, dining room
Rims, split wood pulleys
Sliding, house
Slide, fly screen
Wainscoting cap, house interior trim
Wainscot rail, house interior trim
Window apron, house interior trim
Window stool, house interior trim

CYPRESS

Astragals, folding door
Astragals, sliding door
Balusters, porch
Bars, greenhouse
Base blocks, house interior trim
Baseboard, house interior trim
Baseboards
Base corners, house interior trim
Base moulding, house interior trim
Battens, O. G. barn
Bay brackets, house construction
Beams, dining room ceiling
Beams, pergola
Beelives
Belt poles, machinists'
Revel sliding, house
Blind stop, house construction
Blinds (house)
Bottom boards, rowboat
Bottom rail, porch
Bottom rails (sash)
Boxes, bottle
Boxes, packing
Brackets, plate rail
Brackets, porch
Brooders, interior
Cabins, exterior, river craft
Cabins, exterior, ships
Cabins, interior, river craft
Cabins, interior, ships
Cabins, interior, yachts
Carpet strip, house interior trim
Cases, casket
Cases, coffin
Cases, incubator

Cases, packing
Casing
Casing, door
Casing, window
Caskets
Chair rail, house interior trim
Churns, butter
Coffins
Colonnades, house interior trim
Columns, pergola
Consoles
Corner beads, house interior trim
Corner blocks, house interior trim
Cornice, house construction
Cornice work, house
Crates, shipping
Cresting, porch roof
Cross arms, telegraph pole
Cross ties, railroad
Decking, motor boat
Doors
Doors, folding
Door, railroad passenger coaches
Doors, sliding
Dust cap, house interior trim
Exterior finish, house
Face brackets, house construction
Fillet, house interior trim
Finish, locomotive cabs
Finish, yacht cabin
Flat battens, house interior trim
Floor boards, rowboat, round bottom
Flooring, porch
Frames, door

Frames, front door sidelights
Frames, window
Frieze rail, porch
Front door, house
Gable brackets, house construction
Gable ornaments, house construction
Gates, railroad crossing
Grilles, house interior trim
Hatch covers, river craft
Hatch covers, ship
Hatch covers, yacht
Head blocks, house interior trim
Head casing, house interior trim
Interior, cupboard
Interior finish, house
Jambs, door
Keels, canal boats
Keels, river craft
Keels, ship
Keels, yacht
Keels on rowboat (flat bottom)
Ladders
Lattice
Leeboards, canoe
Lids, washing machine
Mantels
Meeting rails (sash)
Mirror doors, house
Moulding, bed, house interior trim
Moulding, brick, house construction
Moulding, cap, house interior trim
Moulding, cove

CYPRESS—Continued.

Moulding, crown, house construction
Moulding, drip cap, house construction
Moulding, exterior house
Moulding, picture
Moulding, plaster, house construction
Moulding, porch
Moulding, quarter round
Moulding, screen
Moulding, spring cove, house construction
Moulding, stair
Mullions (sash)
Nosing, house construction
Panels, door
Panel strips, house interior trim
Parting strip, house interior trim
Partition moulds, house interior trim
Parts, automobile bodies
Planking, motor boat
Planking, river craft

Planking, ship
Planking, yacht
Plate rail, dining room
Porch columns, built up
Porch columns, solid
Porch newels, built up
Porch newels, solid
Porch, spandrel
Rafters, pergola
Rails, door
Rudders, river craft
Rudders, ship
Rudders, yacht
Sash
Sash, hotbed
Sash, railroad passenger coach
Screens, door
Screens, window
Scroll sawed balusters, porch
Shingles
Slides, rowboat (flat bottom)
Slits
Slide, fly screen
Spindles, porch
Staves, tight cooperage
Stiles, door

Stops, door, house interior trim
Stops, window, house interior trim
Sub-frames, hotbed
Tanks
Tanks, dairyman's
Tanks, paper mill
Tanks, pickling
Tanks, wooden
Thresholds, porch door
Top rail, porch
Top rails (sash)
Tubs, washing machine
Vats
Vats, dairyman's
Vats, paper mill
Wainscot rail, house interior trim
Wainscoting cap, house interior trim
Washboards, dairyman's
Water tubs, wooden bridge
Window apron, house interior trim
Window stool, house interior trim

DOGWOOD

Bobbins
Handles, brick trowel
Handles, kitchen knife

Handles, kitchen fork
Handles, small tools
Mallets, coppersmith

Mallets, tinner's
Shuttles

DONCELLA

Shuttles

ERONY

Backs, clothesbrush
Backs, hairbrush
Canes
Checkers

Chessmen
Handles, chafing dish
Handles, drawing instruments
Handles, pocket knife

Handles, tea strainer
Handles, umbrella
Pipes, smoking
Walking sticks

ELM, CORK

Baskets, vegetable
Battens, dumb-waiters
Beams, elevator cars
Beds, coal wagon
Bent seats, automobile
Blocks, hub
Boxes, packing
Boxes, weight (dumb-waiter)
Boxes, wheat drills
Cabinets, kitchen
Chair rockers
Chairs, step ladder
Churns, butter
Cleats, dumb-waiters
Crating
Doubletrees
Dumb-waiters
Eveners
Egg cases
Frames, sieve
Friction blocks, derrick

Gear parts, flour mill machinery
Grain boxes, corn planters
Guide posts, dumb-waiters
Guide rails, dumb-waiters
Handles, machine
Handles, plow
Hay rake parts
Heading, slack cooperage
Hoops, slack cooperage
Hoppers, grain
Hounds, light vehicle
Hubs
Hubs, carriage wheels
Hubs, light delivery wagons
Hubs, light vehicles
Ladders
Over-head beams, dumb-waiters
Parts, automobile bodies
Parts, hay baler
Pews, church
Platforms, elevator

Platforms, machine
Reaches, light vehicle
Rims (automobile wheels)
Rims, basket
Rims, butter tub
Rollers, cable
Runners, sleigh
Shelves, dumb-waiters
Singletrees
Skids, engine
Staves, cement barrels
Staves, slack cooperage
Swings, lawn
Traps, mouse
Traps, rat
Trees, saddle
Trucks, gasoline engine
Tubs, lard
Whiffletrees
Yokes, neck

ELM, WHITE

Backs, chair
Backs, kitchen cabinets
Baskets
Baskets, split
Baskets, vegetable
Blocks, brush
Boards, ironing
Boards, pastry
Bookcases, inside work
Bodies, automobile
Boxes, wheelbarrow
Boxes, trunk
Boxes, knife
Boxes, comb
Boxes, cheese
Boxes, candy
Box shooks
Brooders, poultry
Bureaus, interior work
Bushel crates

Bushel measures
Cabinets, medicine
Cabinets, printers'
Cabinets, seed
Cases, type
Chairs
Chairs, kitchen
Chairs, rocking
Chests, ice
China closets, inside work
Commodores, inside work
Crating
Doors, automobile
Eveners
Fixtures, bar
Fixtures, office
Fixtures, store
Flasks, foundry
Flooring
Frames, chair

Frames, couch
Frames, cultivators
Frames, davenport
Frames, lounge
Frames, sofa
Frames, upholstered furniture
Furniture, toy
Game boards
Handles, basket
Handles, canthook
Handles, cross-cut saw
Handles, peavy
Heading, slack cooperage
Hoops, slack cooperage
Hubs, wheelbarrow
Ladders, step
Lath
Locomotive cabs, interior
Paper pulp
Parts, washing machine

ELM, WHITE

Pastry sets
Pews, church
Pins, insulator
Pokes, horse
Refrigerators
Rims, cheese box
Rims, sieve
Rungs, ladder
Seat frames, chair

Showcases
Sieves, ash
Signboards
Slats, trunk
Sleds, bob
Slides, extensionable
Splint baskets, porch hammocks
Stands, bible
Staves, slack cooperage

Stops, drawer
Tables, communion
Telephone apparatus
Tops, sleds
Traps, mouse
Traps, rat
Tubs
Washboards, laundry
Veneer

EUCALYPTUS

Furniture, special work

FIR, BALSAM

Freezers, ice cream
Lath

Oars, boat
Pulp, paper

SILOS

FIR, DOUGLAS

Astragals, folding door
Astragals, sliding door
Balusters, porch
Base blocks, house interior trim
Base board, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Battens, O. G. barn
Bay brackets, house construction
Beams, dining room ceiling
Bevel siding, house
Blind stop, house construction
Blinds, window
Booms, river craft
Booms, ship
Bottom boards, barge
Bottom boards, row boat
Bottom boards, scow
Bottom rail, porch
Bottoms, piano cases
Brackets, plate rail
Brackets, porch
Brackets, telegraph pole
Bumping posts, railroad
Cabins, exterior, river craft
Cabins, exterior, ships
Cabins, exterior, yacht
Capping, sink, house interior trim
Carpet strip, house interior trim
Casing, door
Casing, window
Ceiling
Chair rail, house interior trim
Colonnades, house interior trim
Corner blocks, house interior trim
Cornice, house construction
Covers, vats
Covers, water tank
Cresting, porch roof
Cross-arms, telegraph pole
Cross-ties, railroad
Decking, boats
Decking (ship and boat)
Derricks, hoisting
Derricks, oil well
Doors, folding
Doors, sliding
Drop siding, house
Dust cap, house interior trim
Face brackets, house construction
Feed mill machinery parts
Fillet, house interior trim
Fireless cookers, exterior

Flat battens, house interior trim
Flooring, electric passenger cars
Flooring, freight cars
Flooring, house
Flooring, porch
Flooring, railway passenger coaches
Flooring, scale platforms
Frames, door
Frames, freight car
Frames, front door side light
Frames, target
Frames, window
Frieze rail, porch
Front doors, house
Gable brackets, house construction
Gable ornaments, house construction
Gates, railway crossing
Hay balers, parts
Hayloaders, parts
Hayrakes, parts
Head blocks, house interior trim
Head casing, house interior trim
Hods, mortar
Jambs, door
Joiners, deck (ship)
Keels, canal boats
Keelsons, river craft
Keelsons, ship
Keelsons, yacht
Ladders, extension
Ladders, step
Lattice
Masts, river craft
Masts (ship)
Mirror doors, house
Moulding, bed, house construction
Moulding, brick, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, interior trim
Moulding, plaster, house construction
Moulding, quarter round
Moulding, screen
Moulding, spring cove, house construction
Nosing, house interior trim

Panel strips, house interior trim
Parting strip, house interior trim
Partition, house
Partition moulds, house interior trim
Planking, barge
Planking, canal boat
Planking, river craft
Planking, scow
Planking, ship
Planking, yacht
Plate rail, dining room
Plates, railway car frames
Poles, flag
Poles, pike
Porch columns, built up
Porch columns, solid
Porch newels, built up
Porch newels, solid
Porch spandrel
Pump rods, windmill
Push poles, locomotive
Refrigerators, exterior
Ridge poles, railway car frames
Scroll sawed balusters, porch
Sides, row boat
Siding, barge
Siding, canal boats
Siding, railway box cars
Siding, railway passenger coaches
Sills, freight cars
Sills, oil well drilling machinery
Sink aprons, house interior trim
Slides, fly screen
Spars, ship
Spindles, porch
Staves, silo
Staves, tight cooperage
Staves, water tanks
Stops, door, house interior trim
Store fronts
Tongues, farm machinery
Top rail, porch
Towers, oil well
Towers, water
Vats
Wainscot rail, house interior trim
Wainscoting cap, house interior trim
Window apron, house interior trim
Window stool, house interior trim

FIR, OREGON

Push poles, locomotive

GUM, BLACK

Baskets, split
Blocks, hub
Boxes, tin ware
Crates, tin ware

Cross-ties, railroad
Fenders, river craft
Friction blocks (railway cars)
Heading, oil bands

Hubs
Hubs, carriage wheels
Hubs, light delivery wagon
Hubs, wheelbarrow

GUM, BLACK—Concluded

Mauls
Mine rollers

Packing cases, plate glass
Rollers, car

Rollers, mine
Staves, oil barrels

GUM, COTTON

Baskets, splint
Baskets, vegetable
Bottoms, drawer
Boxes, berry
Boxes, cigar
Boxes, cracker
Boxes, milk bottle
Boxes, packing
Boxes, trunk
Cases, sample
Cases, traveling

Coops, poultry
Crates, beer
Crates, fruit
Crates, vegetable
Crating
Cross-ties, railroad
Dishes, lard
Heads, maul
Hoppers, machine
Legs, table
Mallets, ship builders

Mortars
Paper pulp
Parts, agricultural machinery
Pestles
Pins, clothes
Plates, pie
Rammers, street
Rollers, awning
Rollers, shipbuilders
Truck barrels, veneered

GUM, BLACK

Baskets, split
Blocks, hub
Boxes, tin ware
Crates, tin ware
Cross-ties, railroad
Fenders, river craft

Friction blocks (railway cars)
Heading, oil barrels
Hubs
Hubs, carriage wheels
Hubs, light delivery wagon
Hubs, wheelbarrow

Mauls
Mine rollers
Packing cases, plate glass
Rollers, car
Rollers, mine
Staves, oil barrels

GUM, RED

Astragals, sliding door
Backs, chairs
Backing, case goods
Balusters, porch
Base blocks, house interior trim
Base board, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Bay brackets, house construction
Beams, dining room ceiling
Blinds, house construction
Blocks, brake
Bottoms, case goods
Bottom rails, porch
Bottom rails, sash
Box shooks
Boxes, creamery shipping
Boxes, macaroni
Boxes, packing
Boxes, trunk
Brackets, porch
Cabinets, music
Capping, sink, house interior trim
Carpet strip, house interior trim
Cases, casket
Cases, clock
Cases, coffin
Cases, sample
Cases, shipping
Casing, door
Casing, window
Caskets
Chair rail, house interior trim
Chairs, rocking
Coal boards, engine tender
Coffins
Colonnades, house interior trim
Consoles
Commodore
Coolers, water
Corner blocks, house interior trim
Crating
Cresting, porch roof
Cross-ties, railroad
Doors
Doors, folding
Doors, sliding
Drawer sides
Drawers
Drawers, cabinets
Dust cap, house interior trim

Face brackets, house construction
Fertilizer distributors, parts
Fillet, house interior trim
Flasks, foundry
Flat battens, house interior trim
Frames, chair
Frames, davenport
Frames, door
Frames, dresser
Frames, front door side light
Frames, window
Frieze rail, porch
Front doors, house
Front rails, beds
Front rails, dresser
Furniture
Gable brackets, house construction
Gable ornaments, house construction
Handles, saw
Handles, sadiron
Head blocks, pattern
Head blocks, house interior trim
Head cases, house interior trim
Hidden work, walnut furniture
House interior trim
Interior finish, house
Jambs, door
Jumpers, baby
Lath
Legs, chiffonier
Legs, dresser
Mantels
Meeting rails, sash
Mirror doors, house
Moulding, bed, house construction
Moulding, brick, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction
Moulding, picture
Moulding, plaster, house construction
Moulding, quarter round
Moulding, spring cove, house construction
Mullions, sash
Nosing, house interior trim

Panel strips, house interior trim
Panels, door
Panels, light delivery wagon
Panels, light vehicle bodies
Panels, stair work
Paper pulp
Parting stop, house interior trim
Partition moulds, house construction
Pipes (smoking)
Plate rail, dining room
Plate rail, house interior trim
Porch columns, built up
Porch columns, solid
Porch newels, built up
Porch newels, solid
Porch spandrels
Posts, beds
Posts, dresser
Pulleys
Rails, door
Rails, dresser
Refrigerators, exterior
Scroll-sawed balusters, porch
Seat frames, chair
Shelving, cabinets
Sink aprons, house interior trim
Slide, fly screen
Spindles, porch
Standards, chiffonier
Standards, dresser
Staves, cement barrels
Sticks, parasol
Stiles, door
Strips, weather
Stops, door, house interior trim
Stops, window, house interior trim
Tables, library
Top rail, porch
Top rails, sash
Tops, desk
Tops, dressers
Tops, chiffoniers
Tops, sideboards
Traps, mouse
Wainscoting cap, house interior trim
Wainscot rail, house interior trim
Walkers, baby
Window apron, house interior trim
Window stool, house interior trim

HEMLOCK

Astragals, folding door
Astragals, sliding door
Balusters, porch
Balusters (stair)
Barge construction

Base blocks, house interior trim
Base board, house interior trim
Base corners, house interior trim

Base moulding, house interior trim
Battens, O. G. barn
Bay brackets, house construction

HEMLOCK—Concluded.

Beams, dining room ceiling
Blind stop, house construction
Booms, river craft
Booms, ship
Bottom boards, foundry flasks
Bottom rail, porch
Bottoms, river barge
Box shooks
Boxes, coal sieve
Boxes, packing
Brackets, plate rail
Brackets, porch
Brackets, stair
Bridge construction
Bull-wheel cants, oil well machinery
Cabins, canal boats
Capping, sink, house interior trim
Carpet strip, house interior trim
Casing, door
Casing, window
Chair rail, house interior trim
Cheese boxes, veneer
Colonnades, house interior trim
Consoles
Corner blocks, house interior trim
Cornice, house construction
Cornice work, house
Crating
Crestling, porch roof
Cross-ties, railroad
Decking, barge
Decking, canal boats
Doors, folding
Doors, sliding
Dust cap, house interior trim
Face brackets, house construction
Fencing
Fillet, house interior trim
Flasks
Flasks, foundry
Flat battens, house interior trim
Flooring
Flooring, freight elevator cars
Flooring, passenger elevator cars
Flooring, wharves
Frames, canal boat
Frames, coal sieve
Frames, door
Frames, freight car
Frames, front door side light
Frames, river craft
Frames, ship
Frames, window
Frames, yacht

Frieze rail, porch
Front doors, house
Fruit jar cases
Gable brackets, house construction
Gable ornaments, house construction
Grilles, house interior trim
Hatch covers, river craft
Hatch covers, ship
Hatch covers, yacht
Head blocks, house interior trim
Head casing, house interior trim
Heading, nail keg
Heading, slack cooperage stock
Incubators
Jambs, door
Keels, river craft
Keels, ship
Keels, yacht
Kelsons, canal boat
Ladders, river craft
Ladders, ship
Lath
Lattice
Lining, canal boats
Mantels
Masts, river craft
Masts, ship
Mirror doors, house
Moulding, bed, house construction
Moulding, brick, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction
Moulding, picture
Moulding, plaster, house construction
Moulding, quarter round
Moulding, screen
Moulding, spring cove, house construction
Moulding, construction
Newel posts, angle
Newel posts, starting
Nosing, house interior trim
Packing, boat launching
Packing cases, plate glass
Pallets, fire brick
Panel strips, house interior trim
Paper pulp
Parting strip, house interior trim

Partition moulds, house interior trim
Patch-boards, freight car
Planking, canal boat
Planking, river craft
Planking, ship
Planking, yacht
Plate rail, dining room
Poles, flag
Porch columns, built up
Porch columns, solid
Porch newels, built up
Porch newels, solid
Porch spandrel
Rafts (stair)
Reels, cable
Reels, wire rope
Refrigerators
Risers, stair
Rosettes, wall (stairway)
Rough horses (stairway)
Scroll-sawed balusters, porch
Seats, row boat
Shoe rails (stair)
Slides, ore car bodies
Slides, row boat
Siding, freight car
Siding, house
Siding, plate glass shipping cases
Sink aprons, house interior trim
Skidding (machine)
Skidding (steam-pump)
Slides, fly screen
Spars, ship
Spindles, porch
Stair horses
Stair work, hidden
Staves, silo
Staves, slack cooperage
Stems, canal boat
Stops, door, house interior trim
Stops, window, house interior trim
String boards (stair)
Thresholds, house interior trim
Top rail, porch
Transoms, row boat
Tread (stair)
Veneer
Wainscot, rail, house interior trim
Wainscot cap, house interior trim
Weather boarding, house
Window apron, house interior trim
Window stool, house interior trim

HICKORY

Arms, chair
Axle beds, perch spring wagon
Axle beds, surrey
Axle beds, buggy
Axles, light vehicles
Axles, lumber wagons
Axles, wagon
Backs, rustic porch chairs
Backs, split chairs
Bottoms, wagon boxes
Boxes, creamery shipping
Bows, automobile top
Brake beams, freight car
Brake lining, hoisting engines
Canes, walking
Caps, axle
Caps, light vehicle
Carts, dump
Carts, road
Cogs, flour mill machinery
Cross bars, buggy shafts
Cross bars, light vehicle
Door boards, coal cars
Door boards, railroad grain cars
Doubtless
Dowels
Eveners, buggy
Eveners, carriage
Eveners, wagon
Felloes
Felloes, heavy vehicle wheels

Felloes, light delivery wagons
Fifth wheel bars, light delivery wagon
Fifth wheel circles, light delivery wagon
Fifth wheel spools, light delivery wagon
Fillers, bame
Flooring, motor truck
Forks, shaking
Frames, bob sled
Frames, coal screen
Frames, gravel screen
Frames, porch chair, rustic
Frames, sand shaking screen
Gear parts, automobile
Gear parts, buggy
Gear parts, light vehicle
Gear parts, vehicle
Gear parts, wagon
Gear woods, flour mill machinery
Grain cradles
Hacks, vehicle
Hames
Handles, adze
Handles, axe
Handles, bench hatchet
Handles, blacksmith's hammer
Handles, bookbinders' machinery
Handles, broad hatchet
Handles, cant hook
Handles, chisel
Handles, double bitted axe
Handles, drawing knife
Handles, electric car
Handles, extension saw
Handles, golf club
Handles, go-devil
Handles, grab maul
Handles, granite hammer
Handles, grub hoe
Handles, hammer
Handles, hand drill
Handles, hatchet
Handles, single bitted axe
Handles, lawn rake
Handles, machinists' hammer
Handles, meat cleaver
Handles, masons' hammer
Handles, maul
Handles, paint brush
Handles, peavy
Handles, peeling axe
Handles, post mauls
Handles, rig builders' hatchet
Handles, riveting hammer
Handles, shingle and lathing hatchet
Handles, sledge hammer

HICKORY—Concluded

Handles, timber carver
Handles, trolley car
Heds, grab maul
Heds, mallet
Hind spring bars, light delivery wagon
Hounds, light delivery wagon
Interior finish, houses
Interior trim, house
Ladders, hay
Lower head blocks, light delivery wagon
Mallets
Mallets, printers'
Mauls
Neck yokes
Neck yokes, light vehicle
Neck yokes, wagon
Quoins, printers'
Parts, automobile body
Picker sticks, loom
Pole futchels, light delivery wagon
Poles, buggy
Poles, hanging strap (electric cars)
Poles, light vehicle
Posts, wagon body
Push poles, railway engine
Ralls, automobile
Rammers
Rammers, concrete
Rammers, street

Reaches, buggy
Rests, foot, (electric cars)
Rests, foot, (railway cars)
Ribs, wagon top
Rims
Rims, automobile wheel
Rims, vehicle rims
Rims, wheel
Rollers
Rounds, chair
Rounds, split bottom chair
Rounds, ladder
Rungs, ladder
Runners, sleigh
Runner frames, sleigh
Runners, bob sled
Screws, bookbinder
Seats, rustic porch chair
Seats, split chair
Shackle bars, light delivery wagon
Shafts, buggy
Shafts, vehicle
Shooting sticks, printers'
Side futchels, light delivery wagon
Singletrees
Singletrees, light and heavy vehicles
Skewers, butchers'
Slackers
Splits, split bottom chair
Splint baskets, porch hammock

Splinter bars, light delivery wagon
Spokes, automobile wheel
Spokes, buggy wheel
Spokes, heavy vehicle wheel
Spokes, light delivery wagon
Spokes, light and heavy vehicle
Spokes, push cart wheel
Sprags, mine
Spring bars
Spring bars, light and heavy vehicle
Spring blocks, wagon
Spring yokes, light delivery wagon
Stakes, heavy vehicle
Stakes, log car
Sweep sticks, loom
Teeth, lawn rake
Teeth, spur gears
Tongues, corn planter
Tongues, light vehicle
Tongues, wagon
Treadle sticks, loom
Trucks, warehouse
Upper head blocks, light delivery wagon
Vehicle stock
Wheelbarrows
Wheels, vehicle
Wreckskids, railway
Whiffletrees, vehicle

HOLLY

Backs, bath brush
Blocks, brush
Cups, soap
Forks, wooden, cooking

Forks, wooden, salad
Handles, rolling pin
Mashers, potato
Paddles, butter

Pins, rolling
Spoons, wooden mixing
Sticks, toddy

HORNBEAN

Balls, duckpin
Balls, tennis
Handles, adze
Handles, canthook
Handles, grab maul

Handles, peavy
Handles, timber carrier
Heading, nail keg
Heds, grab maul

Neck yokes
Neck yokes, jockey
Sides, cheese box
Whiffletrees

LAUREL, MOUNTAIN

Inlaid work, furniture

LANCEWOOD

Rods, fishing

LIGNUM-VITAE

Balls, lemon squeezer
Balls, lime squeezer
Bung starters

Cups, lemon squeezer
Cups, lime squeezer
Heds, mallet

Mallets, coppersmith
Mallets, printers'

LOCUST

Brackets, telegraph pole
Cross-arms, telegraphs pole

Hubs, light delivery wagon
Paper pulp

Pins, insulator
Pins, telephone

MAHOGANY

Antique furniture, exterior
Arms, chair
Balusters, stair
Back posts, chair
Base boards, house interior trim
Base moulding, house interior trim
Beams, dining room ceiling
Beds, folding, exterior
Bedsteads, exterior
Benches, piano
Book racks, revolving
Book cases, sectional
Brackets, plate rail
Brackets, stair
Cabinets, magazine
Cabinets, music
Cabinets, phonograph
Cabinets, scale

Cabinets, smokers
Cabins, interior ships
Cabins, interior, yachts
Carpet strip, house interior trim
Carvings, wood
Cases, binnacle
Cases, chart (ship)
Cases, dental
Cases, hall clock
Cases, optical
Cases, piano
Casing, door
Casing (veneered), pipe organ
Casing, window
Caskets
Cellarettes, exterior
Chair arms, sleeping coaches
Chair rail, house interior trim
Chairs, arm
Chairs, morris

Chests, hall
Chests of drawers, exterior
Chests, silverware
Cheval mirrors
Chiffoniers, exterior
Coffins
Colonnades, house interior trim
Colonnades, pullman coaches
Commodore, exterior
Consoles
Counters, bar room, exterior
Covers, switch boxes, (electric cars)
Covers, switch box (Pullman coaches)
Cupboard doors, Pullman coaches
Deck boards, automobile
Dash boards, automobile
Decking, canoe

MAHOGANY—Concluded

Decking, motor boat
Desk chairs
Door strips, automobile
Doors, folding
Doors, locker, boat and ship
Doors, ship cabin
Doors, sliding
Doors, upper berth (sleeping coaches)
Facings, window partitions (electric cars)
Filing cases, sectional
Fillet, house interior trim
Fine cabinet work
Finish, yacht cabins
Flat battens, house interior trim
Flooring, parquetry
Foot rails, stair
Foot rests
Foot stools
Frames, chair
Frames, couch
Frames, davenport
Frames, door, house interior trim
Frames, mirror
Frames, picture
Frames, settee
Frames, upholstered chair
Furniture
Furniture, office
Furniture, special period
Gauges, carpenters'
Glass front boards, automobile
Gunwales, canoe
Grilles, house interior trim
Grilles, Pullman coach
Grilles, ship cabin
Ground glass frames, camera
Hall mirror hatracks
Handles, camera slides
Handles, hand scraper
Hand rails, yacht
Head casing, house interior trim
Hubs, pilot wheels, boat and ship
Interior finish, camera
Interior finish, electric cars
Interior finish, Pullman coaches
Key bottoms, piano

Legs, piano
Legs, table
Lens boards, camera
Lids, water closet
Lunch tables, portable, pullman coaches
Mantels
Mirror doors, house
Mirror frames, passenger elevator cars
Mirror frames, pullman coaches
Mirror frames, ship cabins
Models
Models, machine
Moulding, bed, house construction
Moulding, cap, house interior trim
Moulding, cove, house interior trim
Moulding, crown, house construction
Mouldings, piano
Mouldings, quarter round
Moulding, spring cove, house interior trim
Music shelf, piano
Newel posts, angle
Newel posts, starting
Panel strips, house interior trim
Panel wainscoting, ship cabin
Panel wainscoting, inside Pullman coaches
Panels, case
Panels, ceiling, Pullman coaches
Panels, clock case
Panels, desk
Panels, passenger elevator cars
Panels, piano cases
Panels, window, Pullman coaches
Parts, automobile bodies
Patterns
Pilasters, piano
Pillars, chair
Pilot wheels, ship
Pilot wheels, yacht
Plate holders, camera
Plate rail, dining room
Players, piano

Princess dressers
Push button frames, Pullman coaches
Rails, stair
Range finders, camera
Rims, pilot wheel (boat and ship)
Rockers, chair
Ruling machines, bookbinders
Sash, Pullman coaches
Sash, ship cabins
Screens, bank
Screens, fire
Seats, piano
Seats, water closet
Servettes, dining room table
Settee
Settles
Shelves, book
Showcases
Sides, piano case
Sills, inside window (electric cars)
Sills, window, inside (pullman coaches)
Spindles, chair
Stands, chafing dish
Stands, plant
Steering wheel rims, automobile
Stools, piano
Tables, drop leaf
Tables, tea
Tops, counter
Tops, table
Trays, jewelry display
Trays, sewing
Treads, stair
Veneer
Veneer, furniture
Veneer, piano cases
Wainscot rail, house interior trim
Wainscoting, house interior trim
Wainscoting cap, house interior trim
Wardrobes, auto-valet
Wheel trays, dining room
Window apron, house interior trim
Window stool, house interior trim

MAPLE, SOFT

Acetate of lime
Alcohol, wood
Backing, cases
Baskets
Baskets, split
Beds, folding
Blinds, porch
Blinds, venetian
Blocks, brush
Boards, hosiery
Bobbins
Bottom rails, sash
Bottoms, butter pails
Bottoms, carriage bodies
Bottoms, fruit baskets
Bottoms, wagon bodies
Box shooks
Boxes
Boxes, bottle
Boxes, comb
Boxes, creamery shipping
Boxes, knife
Boxes, plate glass packing
Boxes, salt
Boxes, tin plate
Boxes, veneer
Brooders
Brushes, wall
Brushes, window
Bureaus, enameled
Cabinet work
Cabinets, medicine
Cases, blacking
Cases, egg
Cases, liquor
Celery crates
Center arms, split wood pulleys
Chairs, children's
Chairs, kitchen
Chairs, laundry

Charcoal
Checkers
Chessmen
Cheval mirrors, enameled
Clothes racks, laundry
Chiffoniers, enameled
Clothespins
Cores, veneer
Commodities
Commodities, enameled
Costumes
Cradles
Crates, fruit and vegetable
Crates, milk bottle
Crating
Dowels, chair
Driers, towel
Dumb-waiter posts
Dusters
Flooring
Frames, chair
Frames, collapsible crates
Frames, couch
Frames, davenport
Frames, door
Frames, parlor furniture
Frames, sofa
Frames, upholstered chair
Frames, upholstered furniture
Frames, window
Furniture, case goods
Furniture, doll
Furniture, interior work
Guide rails, dumb waiter
Handles, paint brush
Handles, umbrella
Handles, whitewash brushes
Heading, slack cooperage
Heads, spool

Interior trim
Interior work, sideboard
Lapboards
Lath
Lining, case
Meeting rails, sash
Middles, spool
Moulding, picture
Mullions, sash
Novelties
Quills
Panels, door
Paper pulp
Patterns
Pedal boards, organ
Porch blinds
Rails, door
Reels, cordage mill
Reels, wire
Ruling machines, bookbinders'
Sash
Saw horses
Screens, door
Screens, window
Seats, baby carriage
Seats, chair
Shelves, book
Shelving
Shuttles
Signboards
Signs, advertising
Speeders
Spool heads
Spools
Stanchions
Staves, slack cooperage
Sticks, parasol
Sticks, umbrella

MAPLE, SOFT—Concluded.

Stiles, door
Stools, camp
Swings, porch
Tabourettes

Tables
Tables, kitchen
Top rails, sash
Toy furniture

Toy tops
Veneer
Wash benches
Wash stands, enameled

MAPLE, SUGAR

Armor backing, ship
Armor blocking, ship
Arms, chair
Arms, split-bottom chair
Axles, cornplanters
Axles, farm wagon
Axles, wagon
Back boards, piano
Back posts, chair
Backs, brush
Backs, chair
Backs, dust brushes
Backs, lawn swings
Backs, nail brush
Backs, scrubbing brush
Beds, warehouse trucks
Benches, automobile
Benches, carpenter
Benches, piano
Blocks, brake
Blocks, brush
Blocks, butchers'
Blocks, die
Blocks, chopping
Blocks, mangle roll
Blocks, pulley
Blocks, tackle
Blades, T-square (draftman's)
Boards, hosiery
Boards, meat
Boards, pie
Boards, potato chip
Boards, potato peeler
Boards, slaw
Bobbins
Bolsters, warehouse truck
Bottom boards, piano
Bottoms, automobile
Bottoms, basket
Bottoms, chair
Bottoms, coal wagon body
Bottoms, drawers
Bottoms, drawer (dental cases)
Bottoms, drawer (optical cases)
Bottoms, land roller top
Bowling alleys
Bowls
Bowls, chopping
Bows, buggy top
Bows, carriage top
Bows, wagon top
Boxes
Boxes, butter
Boxes, candy
Boxes, comb
Boxes, foundry moulding
Boxes, knife
Boxes, packing
Boxes, salt
Boxes, tin plate
Brackets, mine
Brakes, electric crane
Bridges, piano
Brushes, paint
Brushes, whitewash
Budging, table sides
Bung starters
Bureaus, exterior
Bushings, cream separator
Cabinets
Cabinets, type
Canes, walking
Cars, hand
Carts, push
Cases, shipping
Seats, type
Cases, wall
Center arms, split wood pulleys
Chairs, children's
Chairs, folding camp
Chairs, rocking
Chair seats, veneered
Chase frames, printers'
Chase furniture, printers'
Children's carriages
Clamps, trouser hanger
Clocks, wall
Clothes driers

Clothes pins
Cogs, flour mill machinery
Collars, cream separator
Cores, typewriter platens
Costumers
Counters, billiard
Covers, butter tub
Crates
Crutches
Cues, billiard
Cups, soap
Decking, canal boat
Dishes, wooden
Display forms, hosiery
Display forms, shoe
Door boards, coal car
Door boards, railroad grain car
Dowels
Dowels, parasol shanks
Dumb waiters
Evensers
Faucets
Fixtures, bar room
Fixtures, barber shop
Fixtures, curtain
Fixtures, office
Fixtures, store
Flasks
Flooring, electric cars
Flooring, engine cab
Flooring, freight car
Flooring, freight car platform scales
Flooring, house
Flooring, mine dump cars
Flooring, parquetry
Flooring, passenger elevator
Flooring, railway car
Frames, blueprint
Frames, box mattress
Frames, buck saw
Frames, clothes wringers
Frames, corn sheller
Frames, cot
Frames, glass cutter
Frames, spraying machine
Frames, ten pin setter
Frames, thresher grain register
Framework, farm machinery
Friction blocks, derrick
Friction blocks, hoisting engine
Gear parts, automobile
Gear woods, threshing machine
Gauges, carpenters'
Guide strips, dumb waiter
Hammer boards, foundry
Handle cross pieces, lawn mower
Handles
Handles, awl
Handles, broom
Handles, brush
Handles, butcher knife
Handles, canthook
Handles, clothes wringer
Handles, coal pick
Handles, coal sieve
Handles, corkscrew
Handles, cross-cut saw
Handles, dust brush
Handles, fishing rod
Handles, hoe
Handles, ice cream freezer
Handles, lawn rake
Handles, mining pick
Handles, paint brush
Handles, peavy
Handles, piano
Handles, roller (bit brace)
Handles, screw driver
Handles, shoe knife
Handles, shovel
Handles, soldering
Handles, spud
Handles, timber carrier
Handles, vice
Handles, umbrella

Hangers, coat
Heading, cement barrels
Heading, cooperage
Heading, nail keg
Heading, slack cooperage
Heads, spool
Hearse tables, (burial carriage)
Interior finish
Jaws, lemon squeezer
Jaws, lime squeezer
Key bottoms, piano
Knobs, door
Knobs, furniture
Krautcutters
Lasts, shoe
Leeboards, canoe
Legs, billiard table
Legs, chiffonier
Legs, curd grinding machine
Legs, dresser
Legs, dressing table
Legs, incubator
Legs, kitchen table
Legs, table
Legs, washing machine
Lemon squeezers
Lime spreaders, gear woods
Lining, piano case
Machine rolls
Mallets
Mallets, stone cutters'
Mashers, potato
Mauls, steak
Middles, spool
Mine cars
Miter boxes, wooden
Models
Moulding, automobile
Moulds, brick
Moulds, butter
Mounting blocks, cash register (electric cars)
Mounting blocks, electrical apparatus
Novelties
Orange racks
Overhead beams, dumb waiter
Packers, flour mill machinery
Paddles, butter
Paddles, canoe
Paper pulp
Parasol sticks
Parquetry flooring
Partitions, drawer
Parts, hay press
Patterns
Pedals, pipe organ
Pin blocks, piano
Pins, cartridge
Pins, clothes
Pins, pie rolling
Pins, rolling
Pipe, wooden water
Planes, printers'
Plates, bread
Poles, curtain
Poles, tent
Porch gates
Posts, bed
Posts, chair
Posts, corn sheller
Posts, dresser
Posts, guide, freight elevator
Posts, piano
Posts, guide, passenger elevator
Posts, split bottom chairs
Press rolls, paper mill machinery
Racks
Racks, curtain display
Racks, rug display
Racks, towel
Racks, umbrella
Rails, foot, automobile
Rails, mine car
Reels, electric wire
Reels, solder wire
Refrigerators

MAPLE, SUGAR—Concluded.

Reglets, printers'
Ribs, threshing grain register
Rims, bicycle
Risers, stair
Rockers, chair
Rockers, rustic porch chairs
Rockers, split bottom chairs
Rods, chair
Roller blocks
Roller, caster
Rollers, dye
Rollers, lawn mower
Rollers, mangle
Rollers, mine
Rollers, paperhangers' seam
Rounds, chair
Runners, drawer
Sash, carriage
Seat frames, canoe
Seats, automobile
Seats, lawn swing
Show cases
Shuttles
Sides, billiard table
Sides, mine dump car
Sills, heavy wagon
Skewers, butchers'
Sluts, ash can
Slats, automobile

Slats, bed
Sleds
Slides, extension table
Slides, table
Space bars, typewriter
Spoils
Spoons, wooden cooking
Spoons, wooden mixing
Springs, mine
Sprues, foundry flask
Squeezers, lime
Staffs, flag
Staves, cement barrel
Stave, cooperage
Staves, slack cooperage
Steering wheels, automobile
Sticks, dye
Sticks, flower
Straw carriers
Stretcher blocks, foundry
Stretchers, chair
Strips, guide, elevator
Sweepers, carpet
Sweeping brushes
Swings, child's
Swings, porch
Tables, library
Tenpins

Thresholds
Throats, tennis racket
Tongues, corn planter
Tongues, land roller
Tongues, wagon
Tops, table
Toy furniture
Toy ten pins
Toy tops
Traps, game
Traps, mouse
Treads, stair
Trucks
Trucks, handy
Truck sills, gas engine
Tracks, sliding seat (outriggers and racing shells)
Trunks
Turning blocks
Type, wood
Veneer
Walkers, baby
Walking sticks
Washboards
Washstands, exterior
Wheelbarrows
Wrestplanks, piano
Wringers, cloths

OAK, BLACK.

Flooring, wagon bodies

OAK, RED.

Armor backing, ship
Armor blocking, ship
Antique furniture, hidden work
Astragals, folding door
Astragals, sliding door
Axles, heavy wagon
Backs, chair
Backs, dust brush
Balusters, stair
Base blocks, house interior trim
Base boards, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Bases, dining table
Beams, dining room ceiling
Beams, plow
Bedsteads, exterior
Blind stop, house construction
Blinds, window
Blocks, brush
Bodies, automobile
Bodies, electric car
Bodies, railway cars
Bodies, wheelbarrow
Body frames, light and heavy vehicles
Bookcases, exterior
Bookcases, sectional exterior
Booths, telephone, exterior
Bottom boards, barge
Bottom boards, scow
Bottom rails, sash
Bottoms, automobile bodies
Bottoms, case goods
Bottoms, feed bag
Bottoms, grape basket
Bottoms, light delivery wagon body
Bottoms, pit cars
Bottoms, wagon seat
Boxes, plate glass packing
Boxes, telephone
Boxes, tin plate
Brackets, insulator
Brackets, plate rail
Brackets, stair
Brackets, telegraph pole
Buffets, exterior
Bureaus, exterior
Cabinets, kitchen, exterior
Cabinets, typewriter
Carpet strip, house interior trim
Carvings, interior house finish
Cases, blacking
Cases, casket
Cases, coffin

Cases, dental
Cases, optical
Cases, organ
Cases, water closet tank
Casing, door
Casing, pipe organ
Casing, window
Caskets
Ceiling
Center arms, split wood pulleys
Chair rail, house interior trim
Chairs, morris, exterior
Chests, silverware
Colonnades, house interior trim
Commodore
Consoles
Corner beads, house interior trim
Corner blocks, house interior trim
Costumers
Coupling poles, light vehicles
Cross arms, telegraph poles
Cross ties, railroad
Deck beams, canal boat
Deck beams, motor boat
Deck beams, river craft
Deck beams, ship
Deck beams, yacht
Desks, school
Doors
Doors, china closets
Doors, folding
Doors, sliding
Doors, storm
Draft timbers, freight cars
Draw beams, railway
Drop gates, light delivery wagon body
Dust cap, house interior trim
Easel blackboards
End sills, freight car
Ends, bookcase
Ends, buffet
Ends, bureau
Ends, chiffonier
Ends, desk
Ends, dresser
Felloes, wagon wheel
Fenders, ship
Fillet, house interior trim
Finish, boat
Fixtures, office (exterior)
Flasks
Flat battens, house interior trim
Flooring
Flooring, house
Foot rests, wagon

Frames, agricultural imple-
ments
Frames, barges
Frames, bucksaw
Frames, canal boat
Frames, cellar door
Frames, cellar window
Frames, collapsible crate
Frames, door
Frames, engine cab
Frames, flour mill machinery
Frames, freight car
Frames, harrow
Frames, mirror
Frames, picture
Frames, river craft
Frames, scow
Frames, ship
Frames, sieve
Frames, window
Frames, yacht
Front doors, house
Front panels, light delivery wagons
Fronts, china closets
Furniture, bedroom
Furniture, mission, exterior
Gear woods, milling machinery
Grilles, house interior trim
Grille work
Gunwales, row boat (round bot-
tom)
Head blocks, house interior trim
Head casing, house interior trim
Heading, oil barrels
Heading, slack cooperage
Heading, tight cooperage
Hold beams, river craft
Hold beams, ship
Hold beams, yacht
Hoops, slack cooperage
Hubs, light vehicle
Interior finish
Interior finish, house
Interior trim, bar room
Inwales, row boat (round bot-
tom)
Jambs, door
Keels, row boat, (round bot-
tom)
Keels, canal boat
Keels, river craft
Keels, ship
Keels, yacht
Keelsons, canal boat
Keelsons, river craft

OAK, RED—Concluded.

Keelsons, ship
Keelsons, yacht
Knees, canal boat
Leaves, dining room table
Legs, billiard table
Legs, brooder
Legs, feed mill elevator
Legs, table
Lids, grape basket
Lids, water closet
Lining, light delivery wagon
Mantels
Medicine cabinets
Meeting rails, sash
Mirror doors, house
Mounting blocks, cash register (electric cars)
Moulding, bed, house interior trim
Moulding, cap, house interior trim
Moulding, cove, house construction
Moulding, crown, house construction
Moulding, electric wire
Moulding, picture
Moulding, plaster, house construction
Moulding, quarter round
Moulding, screen
Moulding, spring cove, house construction
Mullions, sash
Newel posts, angle
Newel posts, starting
Nosing, house interior trim
Novelties
Panel strips, house interior trim
Panels, door
Parquetry flooring
Partitions, office
Partitions, store
Pastry sets
Pedestals
Pedestals, table
Pews, church
Pilots, locomotive
Pins, insulator
Planking, barge
Planking, scow

Plate rail, dining room
Posts, bed
Posts, bookcase
Posts, buffet
Posts, chair
Posts, chiffonier
Posts, desk
Posts, dresser
Posts, sideboard
Pulpits, exterior
Racks, magazine
Rails, door
Rails, stair
Rails, table
Reels, electric wire
Reels, solder wire
Refrigerators
Ribs, motor boat
Ribs, row boat (round bottom)
Rims, split wood pulleys
Risers, stair
Rosettes, wall (stairway)
Runners, sleigh
Running boards, automobile
Running boards, electric cars
Sash
Screens, door
Screens, window
Seats, chair
Seats, water closet
Shelves, book
Shelves, china closet
Shelves, mantel
Shingles
Shoe rails, stair
Showcases
Sideboards, exterior
Sideboards, interior
Sides, billiard tables
Sides, case
Sides, push carts
Sides, wagon
Sills, door
Sills, gasoline engine truck
Sills, heavy wagon
Sills, log car
Sills, stone crusher
Sills, wagon
Slat, lawn seat
Sofas, exterior
Spokes, cart wheel
Spokes, light vehicle

Stanchions, canal boat
Stanchions, river craft
Stanchions, ship
Stanchions, yacht
Stands, Bible
Stands, plant
Stands, umbrella
Staves, cement barrel
Staves, oil barrel
Staves, slack cooperage
Staves, tight cooperage
Stay bars, light delivery wagon
Stems, row boat (flat bottom)
Stem posts, row boat
Sterns, row boat (round bot-
tom)
Stern posts, row boat (round bottom)
Stiles, door
Stops, door, house interior trim
Store fronts
String boards, stair
Strips, weather
Studding, log car
Swings, porch
Tables
Tables, extension
Tables, sewing
Tabourettes
Thresholds, house interior trim
Tillers, canal boat
Toprails, sash
Tops, table
Toy furniture
Toy tops
Transoms, row boat (round bottom)
Trays, incubator
Treads, stair
Veneer
Veneer cores, piano cases
Ventilators, window
Wainscotting
Wainscotting, cap, house interior trim
Wainscotting rail, house interior trim
Washstands, exterior
Window apron, house interior trim
Window stool, house interior trim

OAK, WHITE.

Acetate of lime
Alcohol, wood
Armor, backing, ship
Armor, blocking, ship
Arms, chair
Astragals, folding door
Astragals, sliding door
Baby tender, walking chairs
Back posts, chair
Backs, chair
Backs, church pew
Backs, vacuum cleaner brush
Balusters, stair
Bars, wooden harrow
Base board, house interior trim
Base blocks, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Baseboards
Basket parts
Beams, coal car
Beams, dining room ceiling
Beams, plow
Beater roll, paper mill machinery
Bedposts
Beds, folding
Beds, light delivery wagon
Bedsteads
Belt, light delivery wagon bodies
Benches, piano
Benches, shop
Blind stop, house construction
Blocks, brush
Blocks, thermometer

Blocks, wagon brake
Boats, row
Bodies, automobile
Bodies, mine pit wagon
Bodies, truck
Bodies, wagon
Body bolsters, freight cars
Bolsters, heavy vehicle
Bolsters, heavy wagon
Bottom boards, mine car
Bottom rails, sash
Bottoms, baggage truck
Bottoms, delivery wagon
Bottoms, ore car bodies
Bottoms, wagon
Bookcases, built-in
Bookcases, sectional
Book racks, revolving
Booths, telephone
Bows, buggy top
Bows, carriage top
Bows, lawn rake
Bows, wagon top
Boxes, bit
Boxes, blacking
Boxes, plug tobacco
Boxes, telephone
Boxes, wagon
Braces, railway car
Braces, railway car frame
Brackets, insulator
Brackets, plate rail
Brackets, telegraph pole
Brackets, telephone
Brake beams, heavy vehicle
Brake blocks, mine pit wagon
Buffets
Buffets, exterior

Buggy bottoms
Bull wheels, derrick
Bull wheel arms, oil well machinery
Bumpers, locomotive
Bumpers, traction engine
Bumping posts, railroad
Bureaus
Bureaus, exterior
Cabinet work
Cabinet work, boat cabins
Cabinets, electrical work
Cabinets, magazine
Cabinets, medicine
Cabinets, music
Cabinets, phonograph
Cabinets, phonograph record
Cabinets, smoker
Cabinets, toilet
Cabinets, towel
Cabinets, type
Cabins, boat
Cages, elevator
Capitals
Carpet strip, house interior trim
Carts, push
Carved ornaments, furniture
Carvings, interior house finish
Cases, blacking
Cases, casket
Cases, clock
Cases, dental
Cases, library
Cases, medicine
Cases, optical
Cases, piano
Cases, railroad ticket

OAK, WHITE, Continued.

Cases, wall
Cases, water closet tank
Casing, door
Casing, pipe organ
Casing, window
Casings
Caskets
Ceiling, boat
Ceiling, house
Cellarettes
Center arms, split wood pulley
Chair frames
Chair rail, house interior trim
Chairs
Chairs, adjustable
Chairs, arm
Chairs, dining
Chairs, invalid
Chairs, kitchen
Chairs, morris
Chairs, nursery
Chairs, office
Chairs, opera
Chairs, revolving
Chairs, rocking
Chairs, rolling
Chairs, stenographers'
Chandeliers, wooden art
Charcoal
Cheese boxes, veneer
Chests, hall
Chests of drawers
Chests, silverware
Chests, tool
Cheval mirrors
Chiffoniers, exterior work
China closets
Churn parts
Churns, butter
Clute points, freight cars
Cleats, wagon box
Clothes trees
Coaming, motor boat
Coffins
Columnades, house interior trim
Columns, porch
Commodore
Communion rails
Consoles
Cores, veneered door
Corner beads, house interior trim
Corner blocks, house interior trim
Corner posts, light delivery wagon
Corner posts, ore car bodies
Costumers
Counters, bar
Counters, soda water, exterior
Counters, store
Couplings, farm wagon
Cradles
Cribs, child's
Cross arms, telegraph pole
Cross ties, railroad
Crossing planks, railroad
Crystal cabinets
Cue racks, billiard
Cupboards, kitchen
Deck beams, canal boat
Deck beams, motor boat
Deck beams, river craft
Deck beams, ship
Deck beams, yacht
Decking, motor boat
Desk chairs
Desks, electric switchboard
Desks, flat top
Desks, roll top
Desks, roll top, exterior
Desks, school
Door boards, coal car
Door boards, railroad grain car
Door frames, china closet
Door frames, freight car
Doors
Doors, china closet
Doors, folding
Doors, sliding
Doubletrees, vehicle
Draft beams, freight car
Draft timbers, freight car
Draw beams, railway car
Draw heads, coal car

Drawer fronts, office fixtures
Drawer sides
Drays
Dressers
Drop gates, light delivery wagon body
Drop lids, desk
Drum lagging, hoisting engine
Dump carts, bodies
Dust cap, house interior trim
Electric cars, interior finish
End panels, dresser
End sills, freight car
End sills, locomotive tender
End sills, log car
Ends, church pew
Ends, mine car bodies
Ends, pit cars
Engine beams, freight cars
Eveners, harrow
Exterior work, electric shoe shining machine
Feeding platform, rock crushing machinery
Felloes
Felloes, automobile wheel
Felloes, heavy vehicle wheel
Fence pickets
Fenders, boat
Fenders, river craft
File cases
Filing cases, sectional
Fillet, house interior trim
Finish, boat
Finish, interior engine cab
Fireless cookers, exterior
Fixtures, bank
Fixtures, bar
Fixtures, barber shop
Fixtures, curtain
Fixtures, laboratory
Fixtures, office
Fixtures, store
Fixtures, store display
Flat battens, house interior trim
Flooring, automobile bodies
Flooring, boats
Flooring, freight cars
Flooring, hardwood
Flooring, house
Flooring, light delivery wagon
Flooring, parquetry
Foot rests
Forebays, flour mill
Frames, agricultural implements
Frames, automobile bodies
Frames, barge
Frames, bobsleds
Frames, canal boat
Frames, chair
Frames, coal screen
Frames, cold storage door
Frames, couch
Frames, davenport
Frames, dump cars
Frames, dump carts
Frames, electric cars
Frames, electric switchboard
Frames, engine cab
Frames, freight car
Frames, gravel screens
Frames, hall clock
Frames, hand coffee mill
Frames, hand mirror
Frames, harrow
Frames, light vehicle
Frames, light vehicle body
Frames, lounge
Frames, mirror
Frames, mission hall clock
Frames, motor boat
Frames, picture
Frames, quarry car
Frames, river craft
Frames, sand shaking screen
Frames, scow
Frames, ship
Frames, surrey body
Frames, tobacco truck
Frames, truck body
Frames, truck sleigh
Frames, upholstered chair

Frames, upholstered furniture
Frames, vessel
Frames, wagon body
Frames, wood-boring machines
Frames, wood-saw
Frames, yacht
Front bolsters, wagon
Front doors, house
Front hounds, wagon
Front panels, light delivery wagon
Fronts, china closet
Fronts, drawer
Fronts, dresser
Furniture, bank
Furniture, bar room
Furniture, barber shop
Furniture, case goods
Furniture, craftsman's
Furniture, drug store
Furniture, office
Furniture, store
Gates, freight elevator
Gear parts, wagon
Gear wood, light wagon
Grilles
Grilles, house interior trim
Guards, boat
Gunwales, boat
Gunwales, canoe
Gunwales, row boat, (round bottom)
Hall mirror hat racks
Hall racks
Handles
Handles, axe
Handles, barrow
Handles, coal pick
Handles, coal shovel
Handles, cultivator
Handles, edge-tool
Handles, hand axe
Handles, machine
Handles, mattock
Handles, mop
Handles, paint brush
Handles, pick
Handles, planters' eye hoe
Handles, plow
Handles, push cart
Handles, railroad pick
Handles, saw
Handles, spading fork
Hand rails, river craft
Hatracks
Head blocks, house interior trim
Head casing, house interior trim
Heading, oil barrel
Heading, slack cooperage
Heading, tight cooperage
Heading, whiskey barrel
Heel board, light delivery wagon
High chair, child's
Hind bolsters, wagon
Hind hounds, wagon
Hold beams, river craft
Hold beams, ship
Hold beams, yacht
Hoops, slack cooperage
Horns, phonograph
Hounds
Hounds, heavy wagon
Hounds, wagon
Hubs, heavy vehicle wheel
Hubs, push cart wheel
Hubs, wagon
Hulls, boat
Ice chest, outside finish
Interior finish
Interior finish, house
Interior finish, electric cars
Inwales, row boat, (round bottom)
Jambs, door
Joiners, deck
Keel blocks, boat
Keels, canal boat
Keels, motor boat
Keels, river craft
Keels, row boat (round bottom)
Keels, ship
Keels, yacht

OAK, WHITE—Continued.

Keelsons, canal boat
Keelsons, river craft
Keelsons, ship
Keelsons, yacht
Kitchen cabinets, exterior
Kitchen safes
Knees, canal boat
Knees, river craft
Knees, ship
Knees, yacht
Knobs, door
Knobs, furniture
Ladders, gymnasium
Ladders, hay
Ladders, river craft
Ladders, ship
Ladders, tobacco
Lagging
Leaves, table
Legs, billiard table
Legs, chair
Legs, desk
Legs, dresser
Legs, piano
Legs, sink
Legs, table
Lids, water closet
Light vehicle bodies
Lining, elevator car
Lower panels, light delivery wagon bodies
Mantels
Mantels, soda fountain
Manure spreaders
Medicine cabinets
Meeting rails, sash
Milk counters, dairyman's
Mine cars
Mine trucks
Mirror cases
Mirror doors, house
Mirrors, adjustable shaving
Mission furniture
Models, machine
Moulding, automobile
Moulding, bed, house interior trim
Moulding cap, house interior trim
Moulding, cove, house construction
Moulding, crown, house construction
Mouldings, piano
Mouldings, picture
Moulding, plaster, house construction
Moulding, quarter round
Moulding, screen
Moulding, spring cove, house construction
Mounting boards, telegraph instruments
Mug cases, barber shop
Millions, sash
Music shelf, piano
Nosing, house interior trim
Novelties
Organ cases
Organs, cabinet
Organs, pipe
Overhead beams, dumb waiters
Overhead beams, freight elevators
Paddle wheels, excursion boats
Panel strips, house interior trim
Panel work, display windows
Panel work, store fixtures
Panels, bed
Panels, door
Panels, stair work
Parallel bars, gymnasium
Parlor cabinets, exterior
Partition moulds, house interior trim
Partitions, office
Partitions, store
Parts, cultivator
Parts, wood sawing machine
Passenger cars, frames
Pastry sets
Patterns
Pedestals
Pew book racks
Pews, church
Picker sticks, loom

Pilasters, furniture
Pilasters, mantel
Pilasters, piano
Pilars, chair
Pilots, locomotive
Pilot wheels, river craft
Pilot wheels, ship
Pilot wheels, yacht
Pins, insulator
Plant stands
Platforms, ten pin setters
Platforms, freight cars
Plate rail, dining room
Plate racks
Play yards, baby
Players, piano
Plow beams
Plow handles
Plow parts
Plows
Poison cases, drug store
Poles, curtain
Poles, farm machinery
Poles, light vehicle
Poles, wagon
Porch swings
Posts, buffets
Posts, carriage body
Posts, chair
Posts, heavy wagon body
Posts, railway car frame
Posts, traction engine cab
Posts, wagon body
Press, tennis racket
Princess dressers
Pulpits, church
Racks, billiard ball
Racks, coat
Racks, display
Racks, key
Rails, bed
Rail, billiard table
Rails, boat
Rails, chiffonier
Rails, china closet
Rails, door
Rails, dresser
Rails, stair
Rails, table
Rails, truck
Rails, wagon
Reaches, buggy
Reaches, heavy vehicle
Reaches, heavy wagon
Reaches, lumber wagon
Reaches, porch spring wagon
Reaches, surrey
Reading desks, church
Rear end posts, light delivery wagon
Reed organs, exterior work
Reels, cable
Reels, wire rope
Refrigerators
Ribs, row boat
Ribs, row boat (round bottom)
Ribs, motor boat
Ribs, wagon top
Rims
Rims, automobile wheel
Rims, buggy wheel
Rims, heavy vehicle wheel
Rims, sieve
Rims, split wood pulleys
Rings, necktie
Rocker frames
Rockers, chair
Rockers, porch chair (rustic)
Rockers, toy
Rollers, field
Rollers, home trainers
Road carts, bottom boards
Rounds, chair
Rounds, plow
Row boats, parts
Rudders, ship
Rudders, yacht
Rudders, river craft
Rungs, chair
Rungs, ladder
Runners, sleigh
Running boards, locomotive
Sand boards, game
Sand boards, wagon
Sash
Scows, frames

Screens, fire
Seat boards, light delivery wagon
Seats, automobile car
Seats, hall
Seats, piano
Seats, water closet
Seats, wire frame chair
Secretaries, exterior
Serving tables
Settee
Settles
Sewing machine parts
Shafts, dump cart
Sheathing
Shelves, book
Shelves, china closet
Shelves, mantel
Shelves, table
Shelving, china closet
Showcase
Shuffleboards
Sideboards, exterior
Sideboards, built-in
Side pillars, light delivery wagon
Side slats, light delivery wagon
Side stakes, freight car
Sides, billiard table
Sides, dump wagon body
Sides, parlor settle
Sides, pit car
Sides, table
Sides, truck
Sidings, boat
Siding, mine car
Sills, automobile body
Sills, carriage
Sills, freight car
Sills, gasoline engine truck
Sills, light delivery wagon
Sills, railway car
Sills, stone crusher
Sills, truck
Sills, vehicle body
Sills, wagon
Sills, wagon body
Singletrees (vehicle)
Slats, automobile
Slats, bed
Sleds, toy
Sofas, exterior
Sofa frames, (upholstered furniture)
Spindles, chair
Splints, surgical
Spokes, automobile wheel
Spokes, heavy vehicle wheel
Spokes, wagon
Spokes, wagon wheel
Spring bars
Spring blocks, railway cars
Spring blocks, railway tank cars
Stanchions
Stanchions, boat
Stanchions, canal boat
Stanchions, river craft
Stanchions, ship
Stanchions, wagon top
Stanchions, yacht
Standards, chiffonier
Standards, dressing table
Stands
Stands, bedroom
Stands, Bible
Stands, chafing dish
Stands, city directory
Stands, flower
Stands, hall (exterior)
Stands, jardiniere
Stands, lamp
Stands, typewriter
Stands, umbrella
Stands, water cooler
Staves, land roller drum
Staves, oil barrel
Staves, slack cooperage
Staves, tight cooperage stock
Staves, water tank
Staves, whiskey barrel
Stay bars, light delivery wagon
Stays, boat
Stems, canal boat

OAK, WHITE—Concluded

Stems, motor boat
Stems, river craft
Stems, ship
Stems, yacht
Steps, stairwork
Stern posts, canal boat
Stern posts, motor boat
Stern posts, river craft
Stern posts, row boats
Stern posts, row boats (round bottom)
Stern posts, ship
Stern posts, yacht
Stiles, door
Stools, office
Stools, piano
Stops, door, house interior trim
Straw carriers
Stretchers, chair
Stretchers, table
Stringers, railway car
Studding, log car
Superstructure, launches
Sway bars, wagon
Sweep sticks, loom
Swing cleats, curtain pole
Swings, lawn
Swings, porch
Switchboards, telephone
Switch timbers, railroad
Tables
Table slides
Tables, billiard
Tables, dining
Tables, dressing
Tables, drop leaf
Tables, extension
Tables, folding

Tables, library
Tables, lunch room
Tables, parlor
Tables, sewing
Tables, tea
Tables, typewriter
Tables, writing
Tabouretts
Tail boards, wagon
Tank cases, water closet
Tanks
Tanks, brewery
Tanks, distilling
Tanks, diving (theatrical)
Thresholds
Thresholds, house interior trim
Tie beams, cars
Ties, railroad track
Tight cooperage stock
Tillers, canal boat
Tillers, river craft
Tongues, cultivator
Tongues, corn planter
Tongue hounds, wagon
Tongues, heavy wagon
Top rails, light delivery wagon
Tops, chair
Tops, counter
Tops, dresser
Tops, table
Tops, wire frame tables
Toy furniture
Toy tops
Trays, jewelry display
Trays, sewing

Transoms, row boat (round bottom)
Treadle sticks, loom
Tree blocks, shoe
Truck bolsters, freight car
Trucks
Trucks, freight car
Trucks, stevedore
Vats, beer
Vats, oil
Vehicle (gear parts)
Veneer
Veneer, furniture
Veneered doors, craftsman
Ventilators, window
Vestment cases, church
Wagons, diamond drill
Wainscoting
Wainscoting caps, house interior trim
Wainscoting (elevator cars)
Wainscoting rail, house interior trim
Wall cases
Wardrobes (exterior)
Washers, fire escape construction
Washstands, exterior
Wedges, foundry
Wheels, water mill
Windlass frames, derrick
Window apron, house interior trim
Window screens
Window sills
Window stool, house interior trim

OLIVEWOOD

Pipes, smoking

PEARWOOD

T-squares, drawing

PERSIMMON

Lasts, shoe

PINE, LOBLOLLY

Backing, furniture
Balusters (stair)
Barn boards
Battens, o. g. barn
Beams, o. h. (elevator)
Beams, ship
Bevel cribbing
Blowers, organ
Blowers, player piano
Boat construction
Boards, lopping
Bottom rails, sash
Bottoms, bank fixtures
Bottoms, office fixtures
Bottoms, store fixtures
Box shooks
Boxboards, heavy vehicles
Boxes
Boxes, bottle
Boxes, coffee
Boxes, dry goods
Boxes, feed cutter
Boxes, packing
Boxes, root cutters
Boxes, trunk
Boxes, weight (dumb waiter)
Boxes, weight (elevator)
Brackets, stair
Cabinets
Car decking
Car siding
Cases, casket
Cases, clock
Cases, shipping
Casing
Ceiling

Ceiling, traction engine cabs
Clapboards
Coffins
Cores, veneer
Cornice
Cornice, house construction
Crates, beer
Crates, cabbage
Crates, milk bottle
Crating
Cross arms, telegraph pole
Cupboards, built in
Decking, freight cars
Doors
Doors, freight car
Excelsior
Excelsior, packing
Excelsior, ribbon (mattress stuffing)
Facia boards, freight cars
Fallow boards, foundry
Fencing
Fixtures
Fixtures, office
Fixtures, store
Flooring
Flooring, porch
Flooring, wagon bed
Frames, coal screens
Frames, door
Frames, gravel screen
Frames, passenger car
Frames, sand shaking screens
Fruit jar cases

Shuttles

Gates, freight elevator
Guide rails (dumb waiter)
Hand rails, stair
Heading, slack cooperage
Insulator pins
Interior finish
Interior finish, house
Interior trim, house
Lath
Lining, dumb waiter shaft
Lining, freight cars
Lockers
Meeting rails, sash
Mouldings
Moulding, bed, house construction
Moulding, crown, house construction
Moulding, crown, house construction
Moulding, picture
Mullions, sash
Newel posts, angle
Newel posts, starting
Nosing, interior house trim
Panels, door
Paper pulp
Partition, house
Patterns (foundry)
Planking, ship
Platforms, carriage hoist
Platforms (elevator)
Poles, tent
Porch work
Rails, door
Rails, stair

LOBLOLLY PINE—Continued

Risers, stair
Roof ribs, freight cars
Roofing, house
Rosettes, wall (stair)
Rough horses (stairway)
Safes, kitchen
Sash
Screens, door
Screens, window

Sheathing
Shelves, dumb waiter
Shelves, mantel
Shelving
Shiplap
Shoe rails, stair
Side boards, wheelbarrow
Sides, corn sheller
Slats, bed

Staves, slack cooperage
Stiles, door
String boards (stair)
Superstructure, electric cars
Top rails, sash
Treads, stair
Wainscoting
Weight boxes (elevator)

PINE, LONGLEAF

Astragals, folding door
Astragals, sliding door
Backing, counters
Balusters, porch
Balusters, stair
Barn boards
Barge construction
Base blocks, house interior trim
Baseboards
Base board, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Bases, gasoline engine
Battens, dumb waiter
Battens, o. g. barn
Bay brackets, house construction
Beams, derrick
Beams, dining room ceiling
Beams, elevator
Beds, coal wagon
Beds, light delivery wagons
Bevel cribbing
Bevel siding, house
Blind stops, house construction
Blinds, window
Blocking, railway tank cars
Bodies, manure spreader
Bodies, railway cars
Bodies, sugar corn cars
Booms, river craft
Booms, ship
Bottom rails (sash)
Bottom rail, porch
Bottoms, dump cart
Bottoms, heavy vehicle
Bottoms, lawn swings
Bottoms, light vehicles
Bottoms, push carts
Boxboards, dump carts
Boxboards, wagon
Box shooks
Boxes, lime and fertilizer
sewers
Braces, freight car
Brackets, plate rail
Brackets, porch
Brackets, stair
Bridge poles (car)
Cabinet work
Cabinets (dental)
Cabinets, jewelry
Cabinets, (toilet)
Cabins, canal boats
Cabins, exterior, river craft
Cabins, exterior, ships
Cabins, exterior, yachts
Capitals
Capping, sink, house interior trim
Carpet strips, house interior trim
Cars, dumb waiter
Cars, elevator
Cart beds
Cases, china
Cases, medicine
Cases, tobacco
Casing, door
Casing, window
Ceiling
Chair rail, house interior trim
Cleats, dumb waiter
Climbing poles, gymnasium
Colonnades, house interior trim
Consoles
Corner beads, house interior trim
Corner blocks, house interior trim
Corner posts, freight cars

Cornice, house construction
Cores, veneer doors
Cores, veneer panels
Covers, ice freezing can
Covers, tank
Cradles, tank cars
Crates, cabbage
Cresting, porch roof
Cross-arms
Cross-ties, railroad
Deck beams, boat
Decking, freight cars
Decking, canal boats
Decking (ship and boat)
Derricks, oil well
Doors, dumb waiter shaft
Doors, folding
Doors, railway box cars
Doors, sliding
Dumb waiter
Dust cap, house interior trim
Elevators (freight)
Elevators (passenger)
Eveners
Face brackets, house construction
Fencing
Filllet, house interior trim
Finish, boats
Finish, caboose interior
Fixtures, bar room
Fixtures, barber shop
Fixtures, cafe
Fixtures, laboratory
Fixtures, office
Fixtures, store
Flat battens, house interior trim
Flooring, automobile
Flooring, engine cab
Flooring, freight cars
Flooring, freight elevators
Flooring, house
Flooring, locomotive tender
Flooring, passenger elevators
Flooring, porch
Flooring, refrigerator cars
Flooring, scale platforms
Footings, pieces (elevator)
Forms, sewer
Frames, awning
Frames, barge
Frames, box car
Frames, couch
Frames, door
Frames, front door side light
Frames, log turners
Frames, motor boat hulls
Frames (passenger cars)
Frames, railroad snow plows
Frames, road scrapers
Frames, scow
Frames, store truck
Frames, window
Framing, freight car
Frieze rail, porch
Front doors, house
Gable brackets, house construction
Gable ornaments, house construction
Grilles, house interior trim
Guides, mine shaft
Guide rails, dumb waiter
Gunwales, row boat (flat bottom)
Hand cars
Hand cars, railway
Hand rails, stair
Hay beam, farm wagon
Hay ladders, farm wagon
Hay rake posts
Head blocks, boat

Head blocks, house interior trim
Head blocks, tank cars
Head casing, house interior trim
Header posts
Heading, slack cooperage
Ice boxes
Interior finish
Jambs, door
Keel strips, row boat (flat bottom)
Keelsons, river craft
Keelsons, ship
Keelsons, yacht
Ladders, exterior
Ladders, step
Lath
Lattice
Lids, water closet
Lining cars
Lining, freight cars
Lining, light delivery wagon
Lining, box cars
Long sills, freight cars
Mantels
Manure spreaders
Meeting rails (sash)
Mirror doors, house construction
Moulding, bed, house construction
Moulding, brick, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction
Moulding, picture
Moulding, plaster, house construction
Moulding, quarter round
Moulding, screen
Moulding, spring cove, house construction
Mountings, rock crushers
Mullions, sash
Needle beams (railway car frames)
Newel posts, angle
Newel posts, starting
Nosing, house interior trim
Ornaments, furniture
Overhead beams, dumb waiter
Panel strips, house interior trim
Panels, door
Panels, stair work
Panels, veneered
Paper pulp
Parting strips, house interior trim
Partition, house
Partition moulds, house interior trim
Parts, milling machinery
Parts, railway motor car
Pianos, interior parts
Planking, boat
Planking, canal boat
Plates, freight cars
Plate rail, dining room
Plates, electric car
Plates, freight cars
Plates, passenger cars
Platforms, freight elevator
Platforms, passenger elevator
Platforms, tank
Plugs, cross-tie
Plumber's woodwork
Poles, farm implements
Poles, flag

PINE, LONGLEAF—Concluded

Poles, land rollers
Poles, tent
Poles, wagon
Porch columns, built up
Porch columns, solid
Porch newels, built up
Porch newels, solid
Porch spandrel
Posts, freight cars
Push cars
Racks, rug display
Rails, door
Rails, river craft
Railway car construction
Reels, cable
Reels, wire rope
Refrigerators
Refrigerators, outside
Ridge poles, freight cars
Risers, stair
Risers, row boat (flat bottom)
Roof framing, silos
Roof ribs, freight cars
Roofing, box cars
Roofing, freight cars
Roofing, house
Rosettes, wall (stairway)
Rough horses, stair
Running boards, locomotive
Sash
Scales
Scoop boards
Scows
Screens, door
Screens, window
Scroll sawed balusters, porch
Seat boards, light delivery wagon
Seats, rowboat
Seats, water closet
Sheathing

Shelves
Shelves, mantel
Shiplap
Shoe rails, stair
Show cases
Shutters
Sideboards, built in
Side planks (gondola cars)
Side plates
Side plates (railway freight cars)
Sides, coal flats
Sides, dumb waiter
Siding
Siding, box cars
Siding, caboose
Siding, freight car
Signboards
Signs, advertising
Sills, door
Sills, electric cars
Sill, freight car
Sills, railway car
Sills, window
Silos
Sink aprons, house interior trim
Slat, bed
Slat, railway cattle cars
Slide, fly screen
Snow boards, engine pilot
Spindles, porch
Stakes, gondola cars
Staves, silo
Staves, slack cooperage
Stems, canal boat
Stem posts, row boat
Stiles, door
Stops, door, house interior trim
Stops, window, house interior trim
String boards, stair

PINE, NORWAY

Balusters, porch
Base blocks, house interior trim
Base board, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Battens, o. g. barn
Bay brackets, house construction
Beams, dining room ceiling
Blind stops, house construction
Bottom rail, porch
Bottom rail, sash
Brackets, plate rail
Brackets, porch
Cabs, locomotive
Capping, sink, house interior trim
Carpet strips, house interior trim
Casing, door
Casing, window
Chair rail, house interior trim
Colonnades, house interior trim
Corner blocks, house interior trim
Consoles
Cresting, porch roof
Door battens, freight car
Doors, folding
Doors, sliding
Face brackets, house construction
Fillet, house interior trim
Flasks, foundry

Flat battens, house interior trim
Flooring, freight cars
Frames
Frames, front door side light
Frames, window
Frieze rail, porch
Front doors, house
Gable brackets, house construction
Gable ornaments, house construction
Grilles, house interior trim
Head blocks, house interior trim
Heading, plate glass shipping cars
Jambs, door
Lattice
Mantels
Meeting rail, sash
Mirror doors, house
Moulding, bed, house construction
Moulding, brick, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction
Moulding, picture
Moulding, plaster, house construction
Moulding, quarter round
Moulding, screen

PINE, PITCH

Bottom boards, farm wagon bodies
Box shooks
Boxes, packing

Boxes, soap
Cornice, house construction
Crating
Flats, hay wagon

PINE, SCRUB

Battens, o. g. barn
Box shooks
Boxes, packing
Cases, packing
Casing, door
Casing, window
Crating
Excelsior

Flooring, porch
Flooring, railway cars
Frames, door
Frames, front door side light
Frames, mirror
Frames, picture

Stringers, railway car
Studding
Supports, elevator
Supports, tank
Swings, lawn
Swings, porch
Tackle blocks
Tanks
Tanks, acid
Tanks, paper mill
Tanks, pickling
Thresholds
Thresholds, house interior trim
Tillers, canal boat
Tillers, river craft
Tongues, agricultural machinery
Tongues, farm machinery
Tongues, manure spreaders
Tongues, wagon
Top rail, porch
Top rails (sash)
Tops, freezing tank
Tops, land rollers
Treads, stair
Trunks
Upper belt rails (freight cars)
Upright, row boats (flat bottom)

Vats
Wainscot rail, house interior trim
Wainscoting
Wainscoting cap, house interior trim
Wall cases
Water tanks, railroad
Window apron, house interior trim
Window stool, house interior trim
Wire cloth display racks

Moulding, spring cove, house construction
Mullions, sash
Nosing, house interior trim
Parting stop, house interior trim
Partition moulds, house interior trim
Panels, door
Panel strips, house interior trim
Plate rail, dining room
Porch columns, built up
Porch columns, solid
Porch newels, built up
Porch newels, solid
Porch, spandrels
Rails, door
Roof strips, freight car
Scroll sawed balusters, porch
Sink aprons, house interior trim
Slide, fly screen
Spindles, porch
Stiles, door
Stops, door, house interior trim
Stops, window, house interior trim
Top rail, porch
Top rails, sash
Wainscot rail, house interior trim
Wainscoting cap, house interior trim
Window apron, house interior trim
Window stool, house interior trim

Flooring, house
Pallets, fire brick
Wainscoting, house construction

Frames, window
Paper pulp
Roofers
Running boards, electric car
Scroll sawed balusters, porch
Siding, barn
Thresholds

PINE, SHORTLEAF

Astragals, folding door
Astragals, sliding door
Balusters, porch
Balusters (stair)
Barn boards
Base blocks, house interior trim
Base board, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Battens, o. g. barn
Bay brackets, house construction
Beams, dining room ceiling
Beds, farm wagon
Bevel cribbing
Bevel siding, house
Blind stop, house construction
Boards, lapping
Booms, river craft
Booms, ship
Bottom boards, foundry flask
Bottom boards, row boat
Bottom rails, porch
Bottom rails (sash)
Box boards
Box shooks
Boxes, feed cutter
Boxes, packing
Boxes, soap
Brackets, plate rail
Brackets, porch
Brackets, stair
Capping, sink, house interior trim
Carpet strip, house interior trim
Casing, window
Casing, door
Ceiling
Chair rail, house interior trim
Colonnades, house interior trim
Consoles
Corner beads, house interior trim
Corner blocks, house interior trim
Cornice
Cornice, house construction
Covers, tank
Crating
Cresting, porch roof
Cross arms, telegraph pole
Cross-ties, railroad
Decking (cars)
Doors
Doors, folding
Doors, freight cars
Doors, sliding
Dust cap, house interior trim
Face brackets, house construction
Fallow boards, foundry
Fencing
Fenders, boat and ship
Fillet, house interior trim
Flasks, foundry
Flat battens, house interior trim
Floor boards, truck
Floor boards, wagon
Flooring, freight cars
Flooring, house
Flooring, incubators
Flooring, locomotive tender

Flooring, porch
Frames, cellar window
Frames, cold storage doors
Frames, door
Frames, front door side light
Frames, land rollers
Frames, lawn swings
Frames, window
Framing, freight cars
Framing, passenger cars
Frieze rail, porch
Front doors, house
Gable brackets, house construction
Gable ornaments, house construction
Grilles, house interior trim
Gunwales, row boat (flat bottom)
Hand cars
Hand rails (stair)
Handles, brush
Handles, long handled dust brush
Handles, mop
Handles, wall brush
Hatch covers, river craft
Hatch covers, ship
Hatch covers, yacht
Head blocks, house interior trim
Head casing, house interior trim
Heading, slack cooperage
Insulation (refrigerator cars)
Jambs, door
Keel strips, row boats (flat bottom)
Ladders, river craft
Ladders, ship
Ladders, step
Lath
Lattice
Lining, box cars
Lining (cars)
Lining, railway car
Lining, railway freight cars
Mantels
Meeting rails (sash)
Mirror doors, house
Moulding, bed, house construction
Moulding, brick, house construction
Moulding cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction
Moulding, electric wire
Moulding, quarter round
Moulding, picture
Moulding, plaster, house construction
Moulding, screen
Moulding, spring cove, house construction
Mullions (sash)
Newel posts, angle
Newel posts, starting
Nosing, house interior trim
Panels (door)
Panels, stair work

Panel strips, house interior trim
Paper pulp
Parting strip, house interior trim
Partition, house
Partition moulds, house interior trim
Parts, butter workers
Plate rail, dining room
Planking, yacht
Porch columns, built up
Porch columns, solid
Porch newels, built up
Porch newels, solid
Porch spandrel
Props, clothes
Rails (door)
Reels, cable
Reels, wire rope
Refrigerators
Risers, row boat (flat bottom)
Risers, stair
Roof boards, silo
Roofing, box cars
Roofing, freight cars
Roofing, house
Roofing, railway car
Roofing, railway freight cars
Rosettes, wall (stairway)
Rough horses (stairway)
Sash
Screens, door
Screens, window
Scroll sawed balusters, porch
Seats, automobile
Seats, row boat
Sheathing
Sheathing, house
Shelves, mantel
Shelving
Shiplap
Shoe rails (stair)
Siding, barn
Siding, box cars
Siding, dredge
Siding, freight cars
Siding, house
Siding, railway car
Sink aprons, house interior trim
Slide, fly screen
Spindles, porch
Staves, slack cooperage
Stiles (door)
Stops, door, house interior trim
Stops, window, house interior trim
String boards (stair)
Stringers, railway cars
Timbers, ship
Top rail, porch
Top rails (sash)
Treads, stair
Uprights, row boat (flat bottom)
Wainscoting
Wainscoting cap, house interior trim
Wainscot rail, house interior trim
Window apron, house interior trim
Window stool, house interior trim
Transoms, row boat

PINE, SUGAR

Astragals, folding door
Balusters, porch
Base blocks, house interior trim
Base board, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Battens, o. g. barn
Bay brackets, house construction
Beams, dining room ceiling
Blind stop, house construction
Bottom rail, porch
Bottom rails, sash
Boxing, pipe organ

Brackets, plate rail
Brackets, porch
Capping, sink, house interior trim
Carpet strip, house interior trim
Casing, door
Chair rail, house interior trim
Colonnades, house interior trim
Consoles
Corner blocks, house interior trim
Cresting, porch roof
Doors, folding
Doors, sliding
Dust cap, house interior trim

Face brackets, house construction
Fillet, house interior trim
Flat battens, house interior trim
Frames, door
Frames, front door side light
Frames, pipe organ
Frames, window
Frieze rail, porch
Front doors, house
Gable brackets, house construction
Gable ornaments, house construction
Grilles, house interior trim

PINE, SHORTLEAF—Concluded

Head blocks, house interior trim	Moulding, plaster, house construction	Sills, pipe organ
Head casing, house interior trim	Moulding, quarter round	Sink aprons, house interior trim
Mullions, sash	Moulding, screen	Slide, fly screen
Jambs, door	Moulding, spring cove, house construction	Spindles, porch
Lattice	Nosing, house interior trim	Stiles, door
Mantels	Panel strips, house interior trim	Stops, door, house interior trim
Meeting rail, sash	Parting stop, house interior trim	Stops, window, house interior trim
Mirror doors, house	Partition moulds, house interior trim	Swell boxes, pipe organ
Moulding, bed, house construction	Plate rail, dining room	Top rail, porch
Moulding, cap, house interior trim	Porch columns, built up	Top rails, sash
Moulding, cove	Porch columns, solid	Wainscot rail, house interior trim
Moulding, drip cap, house construction	Porch newels, solid	Wainscoting, cap, house interior trim
Moulding, picture	Porch spandrels	Wind chests, pipe organ
	Rails, door	Window apron, house interior trim
	Scroll sawed balusters, porch	Window stool, house interior trim

PINE, WESTERN YELLOW

Balusters, porch	Fillet, house interior trim	Moulding, spring cove, house construction
Base blocks, house interior trim	Flat battens, house interior trim	Mullions, sash
Base board, house interior trim	Frames, door	Nosing, house interior trim
Base corners, house interior trim	Frames, window	Panel strips, house interior trim
Base moulding, house interior trim	Frieze rail, porch	Parting strips, house interior trim
Battens, o. g. barn	Front doors, house	Parting moulds, house interior trim
Bay brackets, house construction	Gable brackets, house construction	Plate rail, dining room
Beams, dining room ceiling	Gable ornaments, house construction	Porch columns, built up
Blind stop, house construction	Grilles, house interior trim	Porch columns, solid
Bottom rails, sash	Jambs, door	Porch newels, built up
Bottom rail, porch	Head blocks, house interior trim	Porch newels, solid
Brackets, plate rail	Head casing, house interior trim	Porch spandrels
Brackets, porch	Lattice	Rails, door
Capping, sink, house interior trim	Mantels	Scroll sawed balusters, porch
Carpet strip, house interior trim	Meeting rails, sash	Sink aprons, house interior trim
Casing, door	Mirror doors, house	Slide, fly screen
Casing, window	Moulding, bed, house construction	Spindles, porch
Chair rail, house interior trim	Moulding, brick, house construction	Stiles, door
Colonnades, house interior trim	Moulding, cap, house interior trim	Stops, door, house interior trim
Consoles	Moulding, cove	Stops, window, house interior trim
Corner blocks, house interior trim	Moulding, crown, house construction	Top rail, porch
Cresting, porch roof	Moulding, drip cap, house construction	Top rails, sash
Cross-ties, railroad	Moulding, picture	Wainscot rail, house interior trim
Doors, folding	Moulding, plaster, house construction	Wainscoting cap, house interior trim
Doors, sliding	Moulding, screen	Window apron, house interior trim
Dust cap, house interior trim		Window stool, house interior trim
Face brackets, house construction		

PINE, WESTERN WHITE

Astragals, folding door	Doors, folding	Moulding, cap, house interior trim
Astragals, sliding door	Doors, sliding	Moulding, cove
Balusters, porch	Dust cap, house interior trim	Moulding, crown, house construction
Base blocks, house interior trim	Face brackets, house construction	Moulding, drip cap, house construction
Base corners, house interior trim	Fillet, house interior trim	Moulding, plaster, house construction
Base moulding, house interior trim	Flat battens, house interior trim	Moulding, screen
Battens, o. g. barn	Frieze rail, porch	Moulding, spring cove, house construction
Bay brackets, house construction	Front doors, house	Nosing, house interior trim
Beams, dining room ceiling	Frames, door	Panel strips, house interior trim
Blind stop, house construction	Frames, front door side light	Parting stop, house interior trim
Bottom rail, porch	Frames, window	Partition moulds, house interior trim
Brackets, plate rail	Gable brackets, house construction	Plate rail, dining room
Brackets, porch	Gable ornaments, house construction	Porch columns, built up
Capping, sink, house interior trim	Grilles, house interior trim	Porch columns, solid
Carpet strips, house interior trim	Head blocks, house interior trim	Porch newels, built up
Casing, door	Head casing, house interior trim	Porch newels, solid
Casing, window	Jambs, door	Porch spandrels
Chair rail, house interior trim	Key bottoms, piano	Scroll sawed balusters, porch
Colonnades, house interior trim	Mantels	Sink aprons, house interior trim
Consoles	Mirror doors, house	Slides, fly screen
Corner blocks, house interior trim	Moulding, bed, house construction	
Cresting, porch roof	Moulding, brick, house construction	
Cross-ties, railroad		

PINE, WESTERN WHITE—Continued.

Spindles, porch	Veneer cores, piano cases	Window apron, house interior trim
Stops, door, house interior trim	Wainscot rail, house interior trim	Window stool, house interior trim
Stops, window, house interior trim	Wainscoting cap, house interior trim	
Top rail, porch		

PINE, WHITE

Astragals, folding door	Consoles	Lining (railway box cars)
Astragals, sliding door	Corner blocks, house interior trim	Lap siding, house
Backs, buffets	Cornice work	Lattice
Backs, bureau	Crating	Mantels
Backs, china closets	Crates, bee	Matches
Backs, mirror	Cresting, porch roof	Mirror doors, house
Balusters, porch	Cross-ties, railroad	Models, machine
Balusters (stair)	Decking, yacht	Moulding, bed, house construction
Base blocks, house interior trim	Doors, dumb-waiter shafts	Moulding, brick, house construction
Base board, house interior trim	Doors, fire	Moulding, cap, house interior trim
Base corners, house interior trim	Doors, folding	Moulding, cove
Base moulding, house interior trim	Doors, freight cars	Moulding, crown, house construction
Battens, o. g. barn	Doors, sliding	Moulding, drip cap, house construction
Bay brackets, house construction	Doors, stable	Moulding, picture
Beams, dining room ceiling	Drain boards, sink	Moulding, plaster, house construction
Beds, light delivery wagon	Drain boards, soda fountain	Moulding, quarter round
Beds, sled	Dust cap, house interior trim	Moulding, screen
Bee hives	Ends, leaf tobacco cases	Moulding, spring cove, house construction
Bins, flour	Excelsior	Moulding, window
Bins, grain	Face brackets, house construction	Moulds, brick
Bins, mill feed	Flasks	Moulds, foundry
Blind stop, house construction	Flat battens, house interior trim	Newel posts, angle
Blinds, window	Flooring	Newel posts, starting
Blocks, toy wagon	Flooring, carriage bodies	Nosing, house interior trim
Boards, drawing	Flooring, collapsible crates	Organs, interior parts
Boards, lapping	Flooring, engine cabs	Pails, candy
Boats, row	Flooring, freight cars	Panel strips, house interior trim
Bodies, wagon	Flooring, incubators	Panels, stair work
Bottom boards, coal flats	Flooring, mine dump cars	Panels, wagon bodies
Bottom boards, barge	Flooring, road scrapers	Paper pulp
Bottom boards, foundry flasks	Folding frames, baby bath tub	Parting stop, house interior trim
Bottom boards, row boat	Forms, concrete	Parting moulds, house interior trim
Bottom boards, scow	Frames, door	Patterns
Bottom rail, porch	Frames, front door side light	Patterns, rubber factory
Bottoms, dredge	Frames, mirror	Pipe organs, interior parts
Bottoms, farm wagon bodies	Frames, picture	Pipe, wooden, water
Bottoms, grape basket	Frames, tobacco	Pipes, organ
Bottoms, leaf tobacco cases	Frames, window	Planking, barge
Bottoms, threshing machine	Frieze rail, porch	Planking, river craft
Bottoms, toy wagons	Front doors, house	Planking, ship
Bottoms, toy wheelbarrows	Gable brackets, house construction	Planking, yacht
Box shooks	Gable ornaments, house construction	Plate rail, dining room
Box shooks, tobacco	Grilles, house interior trim	Porch columns, built up
Boxes, battery	Guide posts, elevator	Porch columns, solid
Boxes, entomological	Gunwales, boat	Porch newels, built up
Boxes, packing	Hatch covers, canal boats	Porch newels, solid
Boxes, plant	Hatch covers, river craft	Porch spandrels
Boxes, shoe	Hatch covers, ship	Posts, elevator
Boxes, trunk	Hatch covers, yacht	Presses, cider
Boxes, weight (elevator)	Head blocks, house interior trim	Props, clothes
Brackets, plate rail	Head casing, house interior trim	Rails, stair
Brackets, porch	Heading, plate glass shipping case	Reels, cable
Brackets, stair	Heading, tight cooperage	Reels, wire rope
Brackets, telegraph pole	Heading, slack cooperage	Risers, stair
Brake locks, mine car	Hoppers, feed mill elevators	Rollers, land
Brooders	Hoppers, mill feed	Roof strips, freight car
Bull wheel carts, oil well machinery	Hoppers, flour	Rosettes, wall (stairway)
Bungs	Hoppers, grain	Rough horses, stair work
Bushel crates	Iceing vats, dairyman's	Rudders, river craft
Cabin finish, canal boats	Interior finish, house	Rudders, ship
Cabins, canal boats	Insulation (railway refrigerator cars)	Rudders, yacht
Cabins, exterior, river craft	Jambs, door	Running boards, freight cars
Cabin exterior, ships	Jambs (elevator)	Screens, door
Cabin, exterior, yachts	Joiner bulkheads, ship	Screens, window
Capping, sink, house interior trim	Joiners, deck (ship)	Scroll sawed balusters, porch
Carpet strip, house interior trim	Keels, canal boat	Scows, coal
Cases, coffin	Keels, river craft	Scows, sand
Cases, organ	Keels, ship	Seat boards, light delivery wagon
Cases, packing	Keels, yacht	Seats, row boat
Cases, sample	Lids, grape basket	Shelves, dumb-waiter
Cases, tobacco	Lining, cast iron pipe for coal mines	Shelving
Cases, tool	Lining, dumb waiter shafts	Shoe rails (stair)
Casing, door	Lining, light delivery wagon	Sides (dumb-waiter)
Casing, window		Sides, engine cabs
Caskets, exterior		Sides, farm wagon bodies
Chair rail, house interior trim		
Chests, clothes		
Cider mills		
Colonial columns		
Colonnades, house interior trim		

PINE, WHITE—Continued

Sides, leaf tobacco cases
Sides, mine dump cars
Sides, river barges
Sides, row boat
Sides, threshing machine
Sides, wagon boxes
Siding, barge
Siding (freight box cars)
Siding, house
Siding (railway cattle cars)
Siding, railway coaches
Silos
Sink aprons, house interior trim
Slide, fly screen
Spindles, porch
Stakes, mine

Stakes, surveyors'
Staves, slack cooperage
Stools, bench
Stops, door, house interior trim
Stops, window, house interior trim
Store fronts
String boards (stair)
Taffy sticks, confectioners'
Tanks
Templates
Tool boxes, stone crusher
Top rail, porch
Top slats, light delivery wagon
bodies
Tops, leaf tobacco cases

Toy carts
Toy furniture
Treads, stair
Trunks
Vats
Wainscot rail, house interior trim
Wainscoting cap, house interior trim
Wheels, water mill
Wind chests, pipe organ
Window apron, house interior trim
Window stool, house interior trim
Work boards, bar room

POPLAR, YELLOW

Actions, piano players
Antique furniture, hidden work
Apparatus parts (electric)
Armor boxes, steel foundry
Automobile bodies
Backing, furniture
Backing, mirror
Backing, refrigerators
Banks, bureau
Banks, carriage seat
Banks, clock case
Banks, china closet
Banks, dental cases
Banks, hat brush
Banks, mirror
Banks, piano
Banks, toy pianos
Banks, wagon seats
Balusters, porch
Balusters (stair)
Base blocks, house interior trim
Base boards, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Baskets, fruit and vegetable
Bay brackets, house construction
Beds, light delivery wagon
Bedsteads
Bellows, organ
Benches, wash
Bevel siding, house
Blinds
Blind stop, house construction
Blinds, window
Blocks, brush
Blocks, hat
Blowers, organ
Blowers, player piano
Boards, bosom
Boards, lap
Boards, lapping
Boards, wash
Bobbins
Bohs, fishing
Bodies, buggy
Bodies, carriage
Bodies, cart
Bodies, dump wagon
Bodies, hearse
Bodies, toy automobiles
Bodies, wagon
Bottom boards, wagon bodies
Bottom rail, porch
Bottom rails (sash)
Bottoms, boys' express wagons
Bottoms, buggy bodies
Bottoms, buggy seats
Bottoms, carriage bodies
Bottoms, clock case
Bottoms, drawer
Bottoms, light vehicle bodies
Boxboards, heavy vehicles
Box shooks
Boxes, bottle
Boxes, butter
Boxes, cake
Boxes, coal sieve
Boxes, cracker
Boxes, creamery shipping
Boxes, macaroni
Boxes, packing
Boxes, plug tobacco
Boxes, wagon

Boxes, weight (elevator)
Braces, boat wheel
Brackets, plate rail
Brackets, porch
Brackets, stair
Brushes
Brushes, dust
Bungs
Bureaus
Butter workers, dairyman's
Cabinets
Cabinets, dental
Cabinets, medicine
Cabinets, scale
Cabinets, towel
Cabinets, type
Cabins, canal boats
Cabins, exterior, river craft
Cabins, exterior, ships
Cabins, exterior, yachts
Cab parts, locomotive
Cabs, locomotive
Capping, sink, house interior trim
Carpet strips, house interior trim
Cars, ensilage
Cases, blacking
Cases, casket
Cases, clock
Cases, dental
Cases, liquor
Cases, optical
Cases, packing
Cases, silverware
Casing
Casing, door
Casing, window
Ceiling
Ceiling, boats
Chair rail, house interior trim
Chairs, barber
Chairs, kitchen
Chests, organ
Chiffoniers
China closets, interior
Cigar boxes
Clog soles (shoes)
Coffins
Colonial columns
Colonnades, house interior trim
Commodities
Compartments, trunk
Consoles
Cores, veneer
Corner blocks, house interior trim
Cornice
Costumers
Counters, store
Crates, beer
Crates, fruit and vegetable
Crates, mineral water
Cresting, porch roof
Cupboards, kitchen
Cushion frames, vehicle
Doors
Desks, interior work
Display forms, hosiery
Display forms, shoe
Doors, folding
Doors, sliding
Drawers, interior
Drain boards, sink
Dressers
Drip boards

Dust cap, house interior trim
Elevators, corn
Elevators, feed mill
Elevators, flour mill
Electric cars, interior finish
Excelsior
Excelsior, packing
Excelsior, ribbon (mattress stuffing)
Face brackets, house construction
Faucets
Fillet, house interior trim
Finish, boats
Firkins
Fixtures, bank
Fixtures, bar
Fixtures, display windows
Fixtures, laboratory
Fixtures, office
Fixtures, store
Flasks, foundry
Flat battens, house interior trim
Foot boards, wagon
Front panels, light delivery wagons
Fronts, kitchen cabinets
Frames, billiard table
Frames, camera
Frames, coal sieves
Frames, couch
Frames, davenport
Frames, door, house construction
Frames, mirror
Frames, lounges
Frames, organ interior
Frames, picture
Frames, upholstered furniture
Frames, window
Frieze rail, porch
Front doors, house
Furniture (hidden work)
Furniture, inside
Gates, farm
Gable brackets, house construction
Gable ornaments, house construction
Grain drills, parts
Grilles, house interior trim
Hand rails, porch
Handles, machine brushes
Head blocks, house interior trim
Head casing, house interior trim
Header parts
Holders, Christmas tree
Hoppers, flour mill machinery
Ice boxes
Interior finish, house
Interior finish, pipe organ
Jambs, door
Jambs (elevator)
Keels, boat
Key bottoms, piano
Lath
Lids, water closet
Lining, light delivery wagons
Lining, refrigerator
Lining, telephone boxes
Litter carriers
Lodge furniture

POPLAR, YELLOW—Continued

Mantels
Mantels (painted work)
Meeting rails (sash)
Mirror doors, house
Mixers, dough
Models
Moulding, bed, house construction
Moulding, brick, house construction
Moulding, cap, house interior trim
Moulding, cove
Moulding, crown, house construction
Moulding, drip cap, house construction
Moulding, piano case
Moulding, picture
Moulding, plaster, house construction
Moulding, porch
Moulding, quarter round
Moulding, screen
Moulding, spring cove, house construction
Music cabinets, interior
Mullions (sash)
Novelties
Newel posts, angle
Newel posts, starting
Organ parts, interior
Outside finish (electric cars)
Packing cases
Paddle wheels excursion boats
Pails, candy
Panel strips, house interior trim
Panel sides, passenger cars
Panels, veneer
Panel work, wagon sides
Paper pulp
Panels, automobile bodies
Panels, auto-truck bodies
Panels, carriage bodies
Panels, coach
Panels, delivery wagon
Panels (door)
Panels, furniture sides
Panels, light wagon bodies
Panels, stair work
Panels, truck sleigh bodies
Panels, vehicle bodies
Panels, wagon bodies
Parting strip, house interior trim
Partitions
Partitions, wagon
Parts, cider mill
Parts, flour mill machinery
Parts, railway motor cars
Passenger cars, interior work
Patterns
Pedestals
Peel blades
Piano parts, interior
Pilasters, mantel

Pins, clothes
Pipe organs, interior parts
Pipes, organ
Pipes (pipe organ)
Plate rail, dining room
Poles, yarn
Pool tables, hidden work
Porch blinds
Porch columns, built up
Porch columns, solid
Porch newels, built up
Porch newels, solid
Porch posts
Porch spandrels
Posts (elevator)
Posts, porch
Pulpits, church
Pumps
Quill boards
Racks, display
Racks, roller towel
Rails (door)
Rails, porch
Rails, stair
Rails, table
Reed organs, interior parts
Reels, electric wire
Reels, solder wire
Refrigerators
Refrigerators, exterior
Rims, split wood pulleys
Risers, stair
Rollers, farm machinery
Rosettes, wall (stairway)
Ruling machines, bookbinders'
Running boards, automobile
Sash
Screens, door
Screens, window
Scroll sawed balusters, porch
Seat backs, buggy
Seats, buggy
Seats, automobile
Seats, car
Seats, carriage
Seats, water closet
Sewing machine parts
Shelving
Shelves, book
Shelves, cabinet
Shelving, dental case
Shoe rails (stair)
Show cases
Shuttles
Sideboards, built in
Sides, drawer
Sides, farm machinery
Sides, flour mill machinery
Sides, threshing machine
Sides, wagon bodies
Sides, wagon box
Siding
Siding, house
Siding, passenger cars
Siding, railway freight cars
Sidings (wagon beds)

Sidings, wagon
Sink aprons, house interior trim
Slide, fly screen
Spars, boat
Spindles, porch
Spoils
Spouting, flour mill
Staging, boats
Staves, cement barrels
Staves, slack cooperage
Steps, step ladder
Stiles, door
Stops, door, house interior trim
Stops, window, house interior trim
Straw carriers
String boards (stair)
Strips, weather
Tables, cafe
Tables, dining
Tables, enameled library
Tables, kitchen
Tables, lunch room
Tabourettes
Top boards (pipe organs)
Top rail, porch
Top rails (sash)
Top slats, light delivery wagon
bodies
Tons, table
Toy carts
Toy furniture
Toy tops
Toy wagons
Transoms, row boat
Traps, mouse
Traveling cases
Trays, trunk
Treads, stair
Troughs, bakers'
Trunk boxes
Type cases
Upper panels, light delivery wagon bodies
Vegetable slicers
Veneer
Veneer cores, organ cases
Veneer cores (piano cases)
Veneer crossbanding
Wainscot rail, house interior trim
Wainscoting, outside (railway cars)
Wainscoting cap, house interior trim
Walkers, baby
Wardrobes
Wardrobes, inside finish
Wheelbarrows
Window apron, house interior trim
Window stool, house interior trim
Wood pulleys
Wood rolls, paper mill machinery

RATTAN

Stocks, whip

REED

Stocks, whip

REDWOOD

Astragals, folding door
Balusters, porch
Base blocks, house interior trim
Base board, house interior trim
Base corners, house interior trim
Base moulding, house interior trim
Bay brackets, house construction
Beams, dining room ceiling
Bevel siding, house
Bottom rail, porch
Brackets, porch
Brackets, porch rail

Carpet strip, house interior trim
Casing, door
Casing, window
Caskets
Cases, coffin
Cases, casket
Chair rail, house interior trim
Coffins
Corner blocks, house interior trim
Cornice
Cresting, porch roof
Cross-ties, railroad
Doors, sliding

Dust cap, house interior trim
Face brackets, house construction
Fillet, house interior trim
Flat battens, house interior trim
Frieze rail, porch
Gable brackets, house construction
Gable ornaments, house construction
Head blocks, house interior trim
Head casing, house interior trim
Incubators
Jambs, door
Mirror doors, house

REDWOOD—Concluded.

Moulding, bed, house construction	Nosing, house interior trim	Siding, freight car
Molding, brick, house construction	Panel strips, house interior trim	Spindles, porch
Molding, cap, house interior trim	Parting stops, house interior trim	Staves, silo
Molding, cove	Patterns	Stops, window, house interior trim
Molding, crown, house construction	Plate rail, dining room	Stops, door, house interior trim
Moulding, drip, cap, house construction	Porch columns, built up	Store fronts
Moulding, picture	Porch columns, solid	Top rail, porch
Moulding, plaster, house construction	Porch newels, built up	Trays, incubator
Moulding, quarter round	Porch newels, solid	Wainscot rail, house interior trim
Moulding, screen	Porch spandrels	Wainscotting cap, house interior trim
Moulding, spring cove, house construction	Ruling machines, bookbinders	Window apron, house interior trim
	Screens, door	Window stool, house interior trim
	Screen, window	
	Scroll sawed balusters, porch	
	Shade hangers	

ROSEWOOD.

Backs, clothes brush	Frames, mirror	Panels, automobile bodies
Backs, hair brush	Frames, picture	Parts (automobile bodies)
Backs, nail brush	Gavels	Pilot wheels, ship
Blocks, brush	Handles, drawing instruments	Pilot wheels, yacht
Bottlestoppers	Handles, surgical instruments	T-Squares (drawing)
Clubs, policeman	Levels, masons	Veneer

SASSAFRAS.

Knees, row boat	Knees, ship	Knees, yacht
Knees, river craft		

SPRUCE.

Balusters (stair)	Frames, dumb waiter	Planking, canoe
Bevel siding, house	Frames, window	Planking, railway cars
Bodies, electric cars	Gunwales, canoe	Planking, scow
Bodies, railway cars	Gunwales, row boat (flat bottom)	Poles, tent
Booms, river craft	Hatch covers, river craft	Rails, stair
Booms, ship	Hatch covers, ship	Reels, cable
Bottom boards, barge	Hatch covers, yacht	Reels, wire rope
Bottom boards, foundry flasks	Interior trim, house	Refrigerators
Bottom boards, row boat	Interior work, canal boat	Ribs, piano
Bottom boards, scow	cabins	Risers, row boat (flat bottom)
Bottom rail, sash	Keel strips, row boat (flat bottom)	Risers, stair
Boxes, bottle	Key bases, piano	Rosettes, wall (stairway)
Boxes, packing	Ladders, extension	Rough horses (stairway)
Brackets, stair	Ladders, river craft	Running boards (electric cars)
Bridges, piano	Ladders, ship	Sash, window
Cases, packing	Ladders, step	Scaffolding (painters)
Ceiling, ship cabin	Lath	Sides, mine dump cars
Cornice, house	Leeboards, canoe	Sides, row boat
Crating	Lining, refrigerator	Sounding board ribs, piano
Cross arms, telegraph pole	Masts, river craft	Sounding boards, piano
Cross-ties, railroad	Masts, ship	Spars (ship)
Diagonal sweeps, piano	Meeting rails, sash	Staves, tight cooperage
Basels, school blackboard	Mullion, sash	Stays, boat
Flasks	Newel posts, angle	String boards (stair)
Flasks, foundry	Newel posts, starting	Studding (ship building)
Flooring, electric cars	Oars, row boat	Tanks, wooden
Flooring, freight cars	Packing cases, plate glass	Top rails, sash
Flooring, mine dump cars	Paddles, canoe	Transoms, row boat
Flooring, railway passenger cars	Planking, barge	Treads, stair
Frames, blackboard		Uprights, row boat (flat bottom)
Frames, cold storage door		

SPRUCE, SITKA.

Balusters, porch	Decking, boat	Moulding, bed, house construction
Base blocks, house interior trim	Doors, folding	Moulding, cap, house interior trim
Base board, house interior trim	Doors, sliding	Moulding, cove
Base corners, house interior trim	Dust cap, house interior trim	Moulding, crown, house construction
Base moulding, house interior trim	Flat battens, house interior trim	Moulding, drip cap, house construction
Beams, dining room ceiling	Frames, door	Moulding, picture
Blind stops, house construction	Frames, front door side light	Moulding, quarter round
Bottom rails, porch	Frames, window	Moulding, spring cove, house construction
Brackets, plate rail	Frieze rail, porch	Nosing, house interior trim
Capping, sink, house interior trim	Front doors, house	Panel strips, house interior trim
Carpet strip, house interior trim	Gable brackets, house construction	Parting stop, house interior trim
Casing, window	Head blocks, house interior trim	Partition moulds, house interior trim
Chair rail, house interior trim	Head casing, house interior trim	Plate rail, dining room
Colonnades, house interior trim	Jambs, door	Porch columns, built up
Corner blocks, house interior trim	Keels, boat	
Cornice work, house	Mirror doors, house	
Crestring, porch roof		

SPRUCE SITKA—Concluded.

Porch columns, solid	Spindles, porch	Window apron, house interior trim
Porch newels, built up	Stops, door, house interior trim	Window stool, house interior trim
Porch newels, solid	Stops, window, house interior trim	
Porch spandrels	Top rail, porch	Poles, tent
Scroll sawed balusters, porch	Wainscotting cap, house interior trim	Rails, stair
Seats, boat	Wainscotting rail, house interior trim	Reels, cable
Siding, house		Reels, wire rope
Sink aprons, house interior trim		Refrigerator
Slide, fly screen		Ribs, piano
Spars, ship		

SUMACH.

Inlaid work, furniture

SYCAMORE.

Base blocks, house interior trim	Doors, sliding	Moulding, plaster, house construction
Base board, house interior trim	Dust cap, house interior trim	Moulding, quarter round
Base corners, house interior trim	Fillet, house interior trim	Moulding, screen
Base moulding, house interior trim	Fixtures, office	Moulding, spring cove, house construction
Basket parts	Fixtures, store	Nosing, house interior trim
Baskets, fruit	Flat battens, house interior trim	Packages, fruit
Baskets, vegetable	Frames, door	Packages, vegetable
Beams, dining room ceiling	Frames, front door side light	Pails, candy
Blind stop, house construction	Frames, window	Panel strips, house interior trim
Blocks, butcher	Front doors, house	Paper pulp
Boat parts	Furniture, case goods	Parting stop, house interior trim
Bottoms, drawer	Gable ornaments, house construction	Partition moulds, house construction
Boxes, packing	Grilles, house interior trim	Parts, washing machine
Boxes, plug tobacco	Handles, hoe	Plate rail, dining room
Brackets, plate rail	Handles, rake	Reed organs, interior parts
Buckets	Handles, saw	Refrigerators
Cabinet work	Head blocks, house interior trim	Sides, drawer
Cabins, interior, ships	Head casing, house interior trim	Sink aprons, house interior trim
Cabins, interior, yacht	trims	Slide, fly screen
Capping, sink, house interior trim	Hoppers, fruit	Stools, foot
Carpet strip, house interior trim	Hoppers, vegetable	Stops, door, house interior trim
Cases, reed organ	Jambs, door	Stops, window, house interior trim
Casing, door	Lath	Wainscot rail, house interior trim
Casing, window	Mantels	Wainscotting cap, house interior trim
Chair rail, house interior trim	Meat blocks	Window apron, house interior trim
Chairs	Mirror doors, house	Window stool, house interior trim
Colonnades, house interior trim	Moulding, bed, house construction	Veneer
Consoles	Moulding, brick, house construction	Venetian blinds
Cooperage stock	Moulding, cap, house interior trim	
Corner blocks, house interior trim	Moulding, cove	
Crating	Moulding, crown, house construction	
Doors, folding	Moulding, picture	

TAMARACK.

Base blocks, house construction	Frames, front door side light	Partition moulds, house construction
Base board, house interior trim	Frames, window	Parting stop, house interior trim
Base corners, house interior trim	Front doors, house	Plate rail, dining room
Base moulding, house interior trim	Grilles, house interior trim	Silos
Beams, dining room ceiling	Head casing, house interior trim	Sink aprons, house interior trim
Blind stop, house construction	trims	Slide, fly screen
Brackets, plate rail	Head blocks, house interior trim	Stem pieces (boat)
Capping, sink, house interior trim	Jambs, door	Stem posts, river craft
Carpet strip, house interior trim	Keels, boat	Stem posts, ship
Casing, door	Knees, canal boat	Stem posts, yachts
Casing, window	Knees, river craft	Stems, river craft
Chair rail, house interior trim	Knees, ship	Stems, yachts
Ceiling, house	Knees, yacht	Stems, ships
Colonnades, house interior trim	Lath	Stops, door, house interior trim
Corner blocks, house interior trim	Mirror doors, house	Stops, window, house interior trim
Cross-ties, railroad	Moulding, bed, house construction	Stringers, boat
Doors, folding	Moulding, cap, house interior trim	Tanks
Dust cap, house interior trim	Moulding, cove	Tubs
Excelsior	Moulding, crown, house construction	Wainscot rail, house interior trim
Fillet, house interior trim	Moulding, picture	Wainscotting cap, house interior trim
Flat battens, house interior trim	Moulding, quarter round	Window apron, house interior trim
Flooring, boats	Moulding, spring cove, house construction	Window stool, house interior trim
Flooring, house	Nosing, house interior trim	
Frames, door	Panel strips, house interior trim	

TEAKWOOD.

Armor backing, ship	Cabins, interior, ship	Rails, yacht
Armor blocking, ship	Cabins, interior, yacht	Rails, ship building

TUPELO.

Cigar boxes

WALNUT, BLACK.

Altars, church	Covers, switch box, Pullman	Panels, case	Pullman
Arms, chair	coaches	Panels, ceiling,	
Back posts, chair	Cupboard doors, Pullman	coaches	
Backs, clothes brush	coaches	Panels, desk	
Backs, hair brush	Dash boards (automobile)	Panels, window,	Pullman
Backs, nail brush	Deck boards, automobile	coaches	
Balusters (stairway)	Desk chairs	Patterns	
Base board, house interior	Doors, sliding	Pews, church	
trim	Doors, folding	Pilasters (piano)	
Base moulding, house interior	Doors, upper birth (sleeping	Pillars, chair	
trim	cars)	Pilot wheels, ship	
Beams, dining room ceiling	Dust cap, house interior trim	Pilot wheels, yacht	
Beds, folding exterior	Fillet, house interior trim	Plate rail, dining room	
Bedsteads, exterior	Finish, interior (automobile	Princess dressers, exterior	
Benches, piano	bodies)	Push button frames, Pullman	
Bible stands, church	Flat battens, house interior	cars	
Blocks, brush	trim	Rockers, chair	
Bookcases, exterior	Flooring, parquetry	Sash, Pullman coaches	
Book racks, revolving	Foot rests	Screens, fire	
Brackets, plate rail	Foot stools	Seats, piano	
Cabins, interior ships	Fore ends, gun	Settees	
Cabins, interior, yachts	Frames, mirror	Settles	
Cabinet making	Frames, picture	Sewing machine parts	
Cabinets, electrical work	Furniture, church	Shelves, book	
Cabinets, magazine	Grilles, house interior trim	Showcases	
Cabinets, phonograph	Grilles, pullman coaches	Spindles, chair	
Cabinets, smokers	Hall mirror batracks	Stands, cbaing dish	
Carpet strip, house interior	Handles, rolling pin	Sticks, toddy	
trim	Handles, saddlers' tool	Stocks, air rifle	
Cases, casket	Hand rails, stairway	Stocks, gun	
Cases, clock	Head casing, house interior	Stools, piano	
Cases, coffin	trim	Stops, window, house interior	
Cases, dental	Heads, carpenter squares	trim	
Cases, hall clock	Heads, T-squares (draftsman)	Tables, dining room	
Cases, optical	Interior finish, Pullman cars	Tables, dropleaf	
Cases, organ	Legs, piano	Tables, exterior	
Cases, piano	Lunch tables, portable, pullman	Tables, library	
Cases, reed organs	coaches	Tables, parlor	
Casing, door	Mirror doors, house	Tables, tea	
Casing, pipe organ	Mirror frames, pullman coaches	Throats, tennis racket	
Casing, window	Moulding, bed, house construc-	Tops, counters	
Cellarettes	tion	Trays, serving	
Chair arms, Pullman coaches	Moulding cap, house interior	Veneer	
Chairs, arm	trim	Veneer, piano cases	
Chair rail, house interior trim	Moulding picture	Wainscot rail, house interior	
Chairs, Morris	Moulding, quarter round	trim	
Chests, hall	Moulding, screen	Wainscoting, house interior	
Chests, medicine	Moulding, spring cove, house	trim	
Chests of drawers, exterior	construction	Wainscoting cap, house interior	
Cheval mirrors	Mouldings, piano	trim	
Chiffoniers, exterior	Music shelf, piano	Wall cases	
Commodore, exterior	Nosing, house interior trim	Window apron, house interior	
Colonnades, house interior trim	Panel strips, house interior trim	trim	
Colonnades, Pullman coaches	Panel wainscoting, Pullman	Window stool, house interior	
Consoles	coaches	trim	

WALNUT, CIRCASSIAN.

Beds, exterior	Chiffoniers, exterior
Bureaus, exterior	Dash boards, automobile
Cabins, exterior, ships	Fore ends, gun
Cabins, interior, yachts	Frames, picture
Case work	Panels, bedstead

WEICHSEL ROOTS.

Canes, walking	Handles, umbrella	Stems, smoking pipes
Handles, parasol		

WILLOW.

Bats, baseball	Pails, candy	Pulp, paper
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MANUFACTURERS.

The names and addresses of the wood users furnishing the information for this report have been listed in arrangement and order corresponding with the industries appearing in the preceding pages. Where the name of a manufacturer is given in several industries it is because he manufactures commodities belonging to more than one industry.

AGRICULTURAL IMPLEMENTS

Hertzler & Zook Co., Belleville	S. L. Allen & Co., Fifth St. & Glenwood Ave., Philadelphia
The A. B. Gaston Co., Cochranston	Philadelphia Lawn Mower Co., Thirty-first & Chestnut Sts., Philadelphia
Nonpareil Mfg. Co., Cochranston	Handle & Excelsior Co., Picture Rocks
A. G. Anchey's Sons, Codorus	Ellis Keystone Agl. Works, Pottstown
Doylestown Agricultural Co., Doylestown	I. T. Zerbe, Reamstown
Hobson & Co., Easton	Wm. H. Fisher, Rebuck
A. Buck's Sons Co., Elizabethtown	Noah C. Stabley, Red Lion
Theo. J. Ely Mfg. Co., Erie	Messinger Mfg. Co., Tatamy
George T. Sellers, Gap	Frank A. Rockwell, Troy
Hamburg Plow Works, Hamburg	Prick Co., Waynesboro
Hanover Bending and Mfg. Co., Hanover	John A. Hart, West Lebanon
Musser Lbr. Co., Marietta	A. B. Farquhar Co., Ltd., York
J. H. Albright & Sons, Mifflinburg	Hench & Bromgold, York
Mountville Mfg. Co., Mountville	Keystone Farm Machine Co., York
Miller Mfg. Co., Meyersdale	The Spangler Mfg. Co., York
Weaver & Co., New Oxford	York Novelty Co., York
J. W. Connor, Orangeville	
C. P. Fox, Perkasie	

BASKETS AND VENEER PACKAGES FOR FRUIT AND VEGETABLES

Pape-Glair Wood Products Co., Brockwayville	E. T. Steele & Sons, 1228 Irwin Ave., N. S., Pittsburgh
Pease & Covell, Conneautville	
J. B. Steel & Co., Coudersport	H. E. McConnell, Torpedo
W. R. Wilcox, Lawrenceville	

BOARDS—CLOTH, HOSIERY, ETC.

A. H. Baillet, Allentown	Joseph T. Pearson, Kensington Ave., Cor. E. Boston, Philadelphia
J. T. Hammond & Son, Inc., 4534 Hedge St., Frankford Sta., Philadelphia	Phila. Packing Box Co., 2634 American St., Philadelphia
Herman Miller, 214-216 W. Dauphin, Philadelphia	Bethlehem Steel Co., South Bethlehem

BOOT AND SHOE FINDINGS

George E. H. Halliwell, 2451 Kensington Ave., Philadelphia	S. S. Redifer & Co., 139 Race St., Philadelphia
Philadelphia Last and Pattern Co., 316-18 Cherry St., Philadelphia	Redifer's Last Works, 237 N. Fourth St., Philadelphia
	William C. Root, 524 Race St., Philadelphia

BOXES AND CRATES, PACKING

Geo. M. Wechter, Akron	Carbondale Machine Co., Carbondale
Allentown Packing Box Co., Allentown	H. Adler Co., Carnegie
Allentown Reed, Harness and Mill Supply Co., Allentown	Superior Steel Co., Carnegie
The Yeager Furniture Co., Allentown	A. C. Kelly, Center Moreland
Penn. R. R. Co. (Foundries), Altoona	C. B. Corry & Son, Center Road Sta.
The Autocar Co., Ardmore	Chambersburg Engineering Co., Chambersburg
Ingersoll Rand Co., Athens	Geo. A. Minnick & Son, Chambersburg
Beaver Falls Planing Mill Co., Beaver Falls	Pittsburgh Plate Glass Co., Charleroi
J. L. McLaughlin & Sons, Bedford	American Steel Foundries, Chester
Bullock Swing and Chair Mfg. Co., Inc., Bellefonte	Federal Steel Foundry Co., Chester
P. B. Cridler & Son, Bellefonte	James M. Hamilton, Chester
Penn. Match Co., Bellefonte	Davis Lumber and Planing Mill, Christiansburg
Blairsville Enameled Ware Co., Blairsville	Gearhart Knitting Machine Co., Clearfield
Columbia Plate Glass Co., Blairsville	Harbison Walker Refractories Co., Clearfield
James Gardner, Jr., Co., Bolivar	Lukens Iron and Steel Co., Coatesville
West Penn. Steel Co., Brackenridge	Freed Heater Co., Inc., Collegeville
Braddock Machine and Mfg. Co., Braddock	The Keeley Stove Co., Columbia
Pitts Machine Tool Co., Braddock	N. H. Goodsell, Coudersport
Blaisdell Machinery Co., Bradford	Penn. Furniture Co., Conneautville
Consolidated Window Glass Co., Bradford	Shamberg & Allen Mch. Co., Coraopolis
I. F. March's Sons, Bridgeport	Pittsburgh Plate Glass Co., Creighton
Bristol Patent Leather Co., Bristol	Dallastown Furniture Co., Dallastown
Standard Cast Iron Pipe and Foundry Co., Bristol	Merchant Cigar Box Co., Dallastown
Brockway Machine Bottle Co., Brockwayville	Pioneer Steam Cigar Box Factory, Dallastown
Greer & Garroway, Butler	H. L. Heiser, Denver
Pittsburgh Hickson Co., Butler	Downingtown Mfg. Co., East Downingtown
Standard Plate Glass Co., Butler	Hobson & Co., Easton
Phoenix Novelty Co., Cambridge Springs	Pittsburgh Meter Co., East Pittsburgh
Nufer Cedar Co., Canonsburg	Westinghouse Elec. and Mfg. Co., East Pittsburgh
The Belmar Mfg. Co., Canton	Westinghouse Machine Co., East Pittsburgh
Minnequa Furniture Co., Canton	C. E. Myers, East Prospect
American Welding Co., Carbondale	The Eddystone Mfg. Co., Eddystone
	Tindel-Morris Co., Eddystone
	C. Prouty & Co., Eldred

BOXES AND CRATES, PACKING—Continued

A. Buck's Sons Co., Elizabethtown
 F. W. Crandall & Co., Elkland
 The Constable Bros. Co., Erie
 Theo. J. Ely Mfg. Co., Erie
 Erie City Mfg. Co., Erie
 Exhibition Showcase Co., Erie
 A. B. Feljemaker Organ Co., Erie
 Lovell Mfg. Co., Erie
 H. N. Thayer Co., Erie
 Washburn Mfg. Co., Erie
 Smith & Spahr, Eilers
 W. C. Laderer, Evans City
 Gray & Son Glass Co., Falls Creek
 Nufer Cedar Co., South Sharon, Farrell P. O.
 Felton Cigar Box Factory, Felton
 Pittsburgh Plate Glass Co., Ford City
 Wm. Shimer Son & Co., Freemansburg
 Girard Wreath Mfg. Co., Girard
 Allegheny Plate Glass Co., Glassmere
 Pittsburgh Steel Foundry, Glassport
 Enterprise Furniture Co., Glen Rock
 S. R. Smith Co., Grantham
 Greensburg Glass Co., Greensburg
 Greensburg Swing Co., Greensburg
 The Kelly & Jones Co., Greensburg
 McKay Carriage Co., Grove City
 Hamburg Plow Works, Hamburg
 H. E. Bair & Co., Hanover
 Hanover Cabinet Co., Hanover
 Hopkins Mfg. Co., Hanover
 Long Furniture Co., Hanover
 The W. O. Hickok Mfg. Co., Harrisburg
 Union Planing Mill Co., Harrisburg
 Atkinson Box and Lumber Co., Hawley
 Hawthorn Bottle Co., Hawthorn
 Boyd Shick, Hawthorn
 S. M. Kann, Hellam
 Prairie State Incubator Co., Homer City
 Wyman Kimble Planing Mill, Honesdale
 The L. C. Hasinger Co., Indiana
 W. S. Wilcox, Jamestown
 T. H. Hazlett Lumber Co., Jeannette
 Pennsylvania Rubber Co., Jeannette
 Union Planing Mill and Lumber Co., Jeannette
 The Lorain Steel Co., Johnstown
 Holgate Bros. Co., Kane
 Kane Blind and Screen Co., Kane
 Kane Flint Bottle Co., Kane
 Kane Window Glass Co., Kane
 Pennsylvania Window Glass Co., Kane
 The Kittanning Plate Glass Co., Kittanning
 Samuel E. Bailey, Lancaster
 Benner Mfg. Co., Inc., Lancaster
 Inland City Cigar Box Co., Lancaster
 Lancaster Leaf Tobacco Case Co., Lancaster
 Geo. E. Wisner, Lancaster
 Dairymen's Supply Co., Lansdowne
 Herrman Aukum & Co., Lebanon
 Lebanon Valley Furniture Co., Lebanon
 Miller Organ and Piano Co., Lebanon
 H. M. Stauffer, Leola
 A. F. Heim Carriage Works, Lenhartsville
 D. M. Nesbit, Lewisburg
 Oneida Community, Ltd., Lititz
 Geo. R. Julius & Bros., Littlestown
 New York Standard Slate Works, Lynnport
 Crescent Bottle Co., McDonald
 Nufer Cedar Co., McKeesport
 W. S. Russell Box and Lumber Co., McKeesport
 The Penn Box Co., Inc., McSherrystown
 Hires Condensed Milk Co., Malvern
 Musser Lumber Co., Marietta
 Masontown Glass Co., Masontown
 Reznor Mfg. Co., Mercer
 Millinburg Body and Gear Co., Millinburg
 Ruhl & Watson, Millmont
 C. A. Sweetland, Mills
 T. W. Waterhouse, Mill Village
 West Branch Novelty Co., Milton
 E. G. Werner & Sons, Mohnton
 Opalite Tile Co., Monaca
 Monessen Box Factory, Monessen
 Montgomery Table Works, Montgomery
 Crandall-Bennett-Porter Co., Montoursville
 Willson-Bennett-Porter Co., Montoursville
 Spring Brook Lumber Co., Moosic
 Robinson Mfg. Co., Muncy
 Sprout, Waldron & Co., Muncy
 S. Liebovitz & Sons, Myerstown
 Nazareth Paper Box Co., Nazareth
 The New Castle Box Co., New Castle
 New Holland Machine Co., New Holland
 Commercial Box Co., New Kensington
 S. J. Bailey, Nicholson
 W. K. Gresh & Sons, Norristown
 Norris Pattern and Machine Co., Norristown
 The Eclipse Co., North Girard
 National Transit Co. Shops, Oil City
 Oil Well Supply Co., Oil City
 United Lumber and Coal Co., Oil City
 Wightman Glass Co., Parkers Landing
 Trethaway Bros., Parsons
 Patton Clay Mfg. Co., Patton
 The Pen Argyle Clock Case Co., Pen Argyle
 Martin & Co., Petersburg
 The Albrow-Clem Elevator Co., Seventh St. and
 Glenwood Ave., Philadelphia
 American Cuckoo Clock Co., 1665 Ruffner St.,
 Philadelphia
 American Steel Foundries, Fifth and Highland
 Aves., Philadelphia
 The Baldwin Locomotive Works, 500 North Broad
 St., Philadelphia
 James Barker, Inc., Sixth and Cayuga, Phila-
 delphia
 The Belber Trunk and Bag Co., 1641 N. Hancock
 St., Philadelphia
 Bodenstein & Kuenmerle, Inc., Lawrence St.
 and Girard Ave., Philadelphia
 J. G. Brill Co., Sixty-second and Woodland
 Aves., Philadelphia
 Carlson Wenstrom Mfg. Co., 2555-59 N. Syden-
 ham St., Philadelphia
 Carmarth Bell & Co., 613-15 Cherry St., Phila-
 delphia
 James W. Cooper Co., 1706-20 Washington Ave.,
 Philadelphia
 Chas. F. Datz Co., Inc., 482-84 N. Fifth St.,
 Philadelphia
 D. H. Davidson, 2005 Washington Ave., Phila-
 delphia
 Paul H. Deigendesch, 145 Florist St., Philadel-
 phia
 Devlin & Heron, 225 N. Juniper St., Philadel-
 phia
 Estate John Galbraith, 619 Commerce St., Phila-
 delphia
 Conrad Gottlieb, 64 N. Fourth St., Philadelphia
 J. T. Hammond & Son, Inc., 4534 Hedge St.,
 Frankford Sta., Philadelphia
 Edw. Harrington Son & Co., Seventeenth and
 Callowhill Sts., Philadelphia
 Samuel Jones & Sons, 2230 Hamilton St., Phila-
 delphia
 William J. Kees, 111 N. Orianna St., Philadel-
 phia
 Ferdinand Keller, 216-24 S. Ninth St., Philadel-
 phia
 Keystone Box Mfg. Co., 701-05 East Girard St.,
 Philadelphia
 Geo. W. Kugler & Sons Co., Inc., 919 New
 Market St., Philadelphia
 A. H. & F. H. Lippincott, Inc., Twenty-fourth
 and Locust Sts., Philadelphia
 T. B. Luzier & Son, 1645 N. Tenth St., Phila-
 delphia
 J. & W. McCauley, 636-38 Filbert St., Philadel-
 phia
 John Martin, 1436 N. 6th St., Philadelphia
 John Maxwell Estate, 425 Locust St., Philadel-
 phia
 Geo. Meisle & Bro., 217 New St., Philadelphia
 S. B. Mench, 2031 E. Fletcher, Philadelphia
 Joseph Miles, River Road, Manayunk Sta., Phila-
 delphia
 Thos. Mills & Bro., Inc., 1301 N. Eighth St.,
 Philadelphia
 William Myers, Quarry St., Philadelphia
 Clayton W. Nichols, 918 Beach St., Philadelphia
 Page & Rainy, 230 S. Second St., Philadelphia
 Joseph T. Pearson, Kensington Ave., Cor. E.
 Boston, Philadelphia
 Pennsylvania Box and Lumber Co., American
 and Cumberland, Philadelphia
 Frank Pettit Ornamental Iron Works, 809 Master
 St., Philadelphia
 Philadelphia Packing Box Co., 2634 American
 St., Philadelphia
 Provident Lumber Co., Water & Dickinson Sts.,
 Philadelphia
 T. B. Rice & Sons Co., Mifflin St. Wharf, Phila-
 delphia
 Scott Paper Co., Seventh and Glenwood Ave.,
 Philadelphia
 Isaac A. Sheppard & Co., Erie Ave. and Sep-
 viva St., Philadelphia
 Thos. D. Shoemaker, 1241 Day St., Philadelphia.

BOXES AND CRATES, PACKING—Continued

Tait Bros., 917 E. Montgomery Ave., Philadel-
 phia
 H. Tiedemann, N. W. Cor. Nineteenth and
 Washington Ave., Philadelphia
 Tloga Foundry Co., Twenty-second and Alle-
 gheny, Philadelphia
 Treen Box Co., Tloga and Memphis Sts., Phila-
 delphia
 Emil Walther, 1106 N. Fourth St., Philadelphia
 Joseph T. Ward, 5809-19 Baynton St., Philadel-
 phia
 Robert Ward, 115 Cuthbert St., Philadelphia
 Weskott & Thomson, 112-114 N. Twelfth St.,
 Philadelphia
 Westmoreland Packing Case Co., 1932 E. West-
 moreland St., Philadelphia
 Wm. Wharton, Jr. & Co., Inc., 25th St. and
 Washington Ave., Philadelphia
 Andrew Wilson, Wilde and Krams, Manayunk
 Sta., Philadelphia
 The Winner Co., 2035-45 N. Seventh St., Philadel-
 phia
 Wirt & Knox Mfg. Co., 22-24 N. Fourth St.,
 Philadelphia
 Wm. Woodward, 3017 N. Lambert St., Philadel-
 phia
 John P. Little Co., Picture Rocks.
 American Steel Foundries, Thirty-sixth St. and
 A. V. Ry., Pittsburgh
 American Window Glass Co., Farmers' Bank
 Bldg., Pittsburgh
 Anchor Box and Lumber Co., 112 Lincoln Ave.,
 Millvale
 Axthelm Mfg. Co., 242 Third Ave., Pittsburgh
 Briggs Machinery Co., 235 Second Ave., Pitts-
 burgh
 A. M. Carrow Co., Penn and Third St., Pitts-
 burgh
 The Chaplin-Fulton Mfg. Co., 28-34 Penn. Ave.,
 Pittsburgh
 Conroy Prugh Co., 1430-36 Western Ave., N. S.,
 Pittsburgh
 Crescent Bottle Co., Pittsburgh
 D. O. Cunningham Glass Co., Twenty-second and
 Jane St., S. S., Pittsburgh
 Dauler, Close & Johns, 636 Smithfield St., Pitts-
 burgh
 John Dunlap Co., P. O. Box 1023, Pittsburgh
 Eiler Lumber and Mill Co., S. Twenty-third St.,
 Pittsburgh
 Epping-Carpenter Co., Forty-first and A. V.
 Ry., Pittsburgh
 Fawcus Machine Co., 2828 Smallman St., Pitts-
 burgh
 Getty Fender & Sons, 278 Woodville Ave., Pitts-
 burgh
 Bernard Gloekler Co., 1127-33 Penn Ave., Pitts-
 burgh
 Iron City Sanitary Mfg. Co., 1514 Oliver Bldg.,
 Pittsburgh
 F. J. Kress Box Co., 2920 Liberty Ave., Pitts-
 burgh
 McConway & Tooley Co., 48th St. and A. V. Ry.
 Co., Pittsburgh
 Macheth-Evans Glass Co., 410 Liberty Ave.,
 Pittsburgh
 The Marine Mfg. and Supply Co., Water St.,
 Pittsburgh
 The Morris and Bailey Steel Co. at Wilson,
 Pittsburgh
 Mortimer Glass Co., 409 Lewis Bldg., Pittsburgh
 Phoenix Glass Co., P. O. Box 757, Pittsburgh
 Picardo Macaroni Co., 179-187 Forty-first St.,
 Pittsburgh
 H. K. Porter Co., 49th St. and A. V. Ry., Pitts-
 burgh
 Richardson Mfg. Co., 855-57 Progress St., Pitts-
 burgh
 F. P. Schlelein Machine Co., 32 W. Parkway,
 Pittsburgh
 A. F. Schwerdt Mfg. Co., 145 McClure Ave., N.
 S., Pittsburgh
 Sigwart & Rolston Mch. Works, Cor. Garrison
 Pl. and Duquesne Way, Pittsburgh
 The Simonds Mfg. Co., Twenty-fifth and Liberty
 Sts., Pittsburgh
 Sommerfeld Machine and Mfg. Co., 216 Second
 Ave., Pittsburgh
 The Standard Scale and Supply Co., 243 Water
 St., Pittsburgh
 U. S. Glass Co., Ninth and Bingham Sts., Pitts-
 burgh
 U. S. Sanitary Mfg. Co., Pittsburgh
 Federated Glass Co., Point Marion
 Jeannette Window Glass Co., Point Marion
 The Morris Glass Co., Point Marion
 Point Marion Window Glass Co., Point Marion
 Alleghany Window Glass Co., Port Alleghany
 Mississippi Glass Co., Port Alleghany
 The Olean Glass Co., Port Alleghany
 Ellis Keystone Agl. Works, Pottstown
 Roberts, Winner & Co., Quakertown
 Steling Furniture Co., Railroad
 Anchor Bending Works, Reading
 Biehls' Carriage and Wagon Works, Reading
 Abner S. Deysher, Reading
 Leinbach Box Co., Reading
 Nolde & Hoost Co., Reading
 Lesher-Kalg Knitting Co., Ltd., Reamstown
 Miller Bros., Red Lion
 Red Lion Furniture Co., Red Lion
 Noah C. Stables, Red Lion
 Oil City Asbestos Co., Reno
 Jefferson Macaroni Co., Reynoldsville
 Landis Bros., Rheems
 M. H. West & Son, Richland
 Victor Box Mfg. Co., Richland Center
 B. H. Harman, Rock Glen
 Emanuel G. Fry, Rothsville
 Buckwalter Stove Co., Royersford
 Diamond Glass Co., Royersford
 Grandeur Stove Co., Royersford
 Keystone Meter Co., Royersford
 W. H. Newborn & Co., Royersford
 Royersford Spring Bed Co., Royersford
 Jno. F. Fitzsimons, Schellburg
 Meck & Keever, Schuylkill Haven
 Noah Law Box Factory, Seven Valleys
 Harper Bros., Shade Gap
 The National Malleable Castings Co., Sharon
 Nufer Cedar Co., Sharon
 Sheffield Glass Bottle Co., Sheffield
 Elk Flint Bottle Co., Shinglehouse
 Boher & Phillips, Shippensburg
 Peerless Furniture Co., Shippensburg
 Shrewsbury Furniture and Mfg. Co., Shrewsbury
 American Slate Works, Slatington
 National School Slate Co., Slatington
 Thomas Zellner, Slatington
 Empire Glass Co., Smethport
 Smethport Glass Co., Smethport
 Bethlehem Steel Co., South Bethlehem
 The Graves & Elghmy Co., Springboro
 Keystone Stove Foundry, Spring City
 Spring City Glass Works, Ltd., Spring City
 Becker Novelty Co., Spring Creek
 Milton E. Shick, Stevens
 Stewartstown Furniture Co., Stewartstown
 Sunbury Table Works, Sunbury
 Fidelity Glass Co., Tarentum
 Pittsburgh Plate Glass Co., Tarentum
 Messinger Mfg. Co., Tatamy
 Titusville Handle Co., Titusville
 J. O. Frost's Sons, Towanda
 Frank A. Rockwell, Troy
 Troy Engine and Machine Co., Troy
 Hanson Furniture Co., Union City
 Loomis Table and Furniture Co., Union City
 The Novelty Wood Works Co., Union City
 The Star Handle Co., Union City
 Keystone Bottle Mfg. Co., Uniontown
 Verona Tool Works, Verona
 Granville Hahn, Walnutport
 Griffiths Charcoal Iron Mills, Washington
 Highland Glass Co., Washington
 Washington Tin Plate Co., Washington
 Emmert Mfg. Co., Waynesboro
 Frick Co., Waynesboro
 Landis Machine Co., Waynesboro
 Landis Tool Co., Waynesboro
 Osterberg Tin Plate Co., Waynesburg
 D. W. Frazee, Wellshoro
 Hoopes Bro. & Darlington, Inc., West Chester
 W. B. Bertels & Son Co., Wilkes-Barre
 George B. Breon, Williamsport
 A. H. Hellman & Co., Williamsport
 National Furniture Co., Williamsport
 J. K. Rishel Furniture Co., Williamsport
 West Branch Box and Lbr. Co., Williamsport
 Westinghouse Air Brake Co., Wilmerding
 Arnold & Tschop, Windsor
 Williamson & Moyer, Womelsdorf
 Nufer Cedar Co., Woodlawn
 Cold Springs Bleaching and Finishing Works,
 Yardley
 H. E. Roring & Bro., York
 Aden Buser, York, R. D.
 A. B. Farquhar Co., Ltd., York

BOXES AND CRATES, PACKING—Continued

H. W. Heffner & Son, York
A. Kaufman & Bro., York
Keystone Farm Machine Co., York
Marion H. Long, York
The Martin Carriage Works, York

Wallick & Gohn, York
West York Furniture Mfg. Co., York
York Carriage Co., York
York Wagon Gear Co., York
Youngsville Mfg. Co., Youngsville

BOXES, CIGAR

Geo. M. Wechter, Akron
A. H. Ballet, Allentown
F. S. Koons, Boyertown
Monroe Jarrett, Cressman
Merchant Cigar Box Co., Dallastown
Pioneer Steam Cigar Box Factory, Dallastown
H. L. Heiser, Denver
John J. Hillegrass, East Greenville
C. E. Myers, East Prospect
M. Kinports, Ephrata
Smith & Spahr, Efters
Felton Cigar Box Factory, Felton
Arthur C. Brown, Freeburg
H. E. Bair & Co., Hanover
S. M. Kann, Hellam
F. A. Helm & Bros., Lancaster
Inland City Cigar Box Co., Lancaster
Geo. E. Wisner, Lancaster
Geo. R. Julius & Bros., Littlestown
Penn Box Co., Inc., McSherrystown
C. Bear, Manheim
Geo. W. Holtzman, Myerstown
New Cumberland Box Co., New Cumberland
W. K. Gresh & Sons, Norristown
E. H. Leaman, Paradise
F. Brecht's Sons, 109 N. Orianna, Philadelphia
Gegner & Klingler, 223 S. American St., Philadelphia
H. W. Jarrett & Co., 2200 Marshall St., Philadelphia
Quaker City Cigar Box Co., 220 N. 2d St., Philadelphia

Henry H. Shelp Mfg. Co., N. E. Cor. 6th St. and
Columbia Ave., Philadelphia
Shelp & Vandergrift, Inc., 814-832 N. Lawrence,
Philadelphia
Keystone Box Co., 19 Miller, Pittsburgh
D. J. Rex & Co., Boyd and Loenst Sts., Pitts-
burgh
P. C. Smith & Bros., Corry and Kilbrick Sts.,
Pittsburgh
Joseph Wasser, No. 1 Miller St., Pittsburgh
Womer & Back, Pottsville
W. B. Pichthorn, Reading
L. R. Miller, Red Hill
J. E. Detwiler, Red Lion
Miller Bros., Red Lion
M. H. Wiest & Son, Richland
Victor Box Mfg. Co., Richland Center
W. A. Kalbach & Sons, Robesonla
Emmanuel G. Fry, Rothsville
Samuel Hauser, Schaefferstown
Monroe D. Sellers, Sellersville
Noah Law Box Factory, Seven Valleys
H. S. Sonder, Souderton
Ertel Bros., Williamsport
Arnold & Tschop, Windsor
Williamson & Moyer, Womelsdorf
James R. Huthmaker, Wyoming
Aden Buser, York
H. W. Heffner & Son, York
A. Kaufman & Bros., York
E. Myers & Co., York
Wallick & Gohn, York

BRUSHES

H. Weitzer, Braman
Earle Brush Co., Columbia
C. A. Mahle & Son, Corry
August Ellge, Hecla
Holgate Bros. Co., Kane
H. A. Williams, Lake Como
Elder & Jenks, 415 Vine St., Philadelphia
Thomas J. Fleming, 131 N. Tenth St., Philadel-
phia

Theo. A. Gerike, 205 Quarry St., Philadelphia
The Harvey & Watt Co., 1822 E. Venango St.,
Philadelphia
Nelms & Co., 407 Commerce St., Philadelphia
Thomas Ott & Co., 1124-1132 Washington Ave.,
Philadelphia
Leon Rozzen, 1003 N. Second St., Philadelphia
A. Steiert & Son, 1406 S. Front, Philadelphia

BUTCHERS' BLOCKS AND SKEWERS

P. B. Crider & Son, Bellefonte
Reading Wood Pulley Co., Reading

Patterson Bros. Co., Wellsboro

CAR CONSTRUCTION

Adamsburg Gas Coal Co., Adamsburg
Alden Coal Co., Alden Station
W. Harry Brown, Alicia
Bellfield Coal and Coke Co., Altoona
Dunbar Coal Mining Co., Altoona
Latrobe Coal Co., Altoona
Lilly Coal Co., Altoona
Penn. R. R. Car Shops, Altoona
East Penn. Lumber Co., Inc., Ananook
Fall Brook Coal Co., Antrim
West Penn. Coal Mining Co., Apollo
Neelr Coal Co., Argentine
Central R. R. Co. of New Jersey, Wilkes-
Barre, Ashley Br. P. O.
Mrs. Louise Mensch, Auburn
Pittsburgh and Southwestern Coal Co., Avella
Charles M. Dodson & Co., Beaver Brook
Beaver Run Coal Co., Beaverdale
A. Davidson, Beaver Falls
Penn. R. R. Co., Bellwood
Geo. P. Brubaker, Berlin
Connell Anthracite Mining Co., Bernice
Wachua-Taylor Anthracite Coal Co., Bernice
American Car and Foundry Co., Berwick
Lehigh and New England R. R., Bethlehem
Kettle Creek Coal Mining Co., Bitumen
Bells Mill Coal Co., Blairsville
Blairsville Coke Co., Blairsville
Conemaugh Coal Co., Blairsville
Graff Coal Co., Blairsville
Kiskiminitas Coal Co., Blairsville
Maher Coal and Coke Co., Blairsville

Roaring Run Mining Co., Blairsville
American Car and Foundry Co., Bloomsburg
Bloomsburg Car and Equip. Co., Bloomsburg
Herman & Hassert, Inc., Bloomsburg
Blossburg and Coal Run Coal Co., Blossburg
Jenkins Bros., Blossburg
Terry Coal Co., Blossburg, R. D.
Improved Traction Eng. Co., Boynton
McClane Coal Co., Bridgeville
Franklin Coal Mining Co., Brisbln
Brier Hill Coke Co., Brier Hill
Schuylkill Lehigh Coal Co., Brockton
Toby Coal Mining Co., Brockwayville
Monongahela R. R. Car Repair Shops, Browns-
ville
Union Connellsville Coke Co., Brownsville
Lake Shore Gas Coal Co., Buena Vista
Casende Coal & Coke Co., Buffalo, N. Y.
Standard Steel Car Co., Butler
East Mountain Coal Co., Carbondale
Wm. M. Cole, Carnegie
P. & R. R. R. Repair Shops, Catawissa
H. K. Wick & Co., Catfish
Cumberland Valley R. R. Co., Chambersburg
Cheat Haven Coal & Coke Co., Cheat Haven
Cherry Tree Iron Works, Cherry Tree
Hastings Coal & Coke Co., Cherry Tree
H. J. Stone Coal Co., Childs
Clearfield Bituminous Coal Corp., Clearfield
Clearfield Clay Working Co., Clearfield
Goshen Coal Co., Clearfield
D. F. Gulich, Clearfield, R. D.

CAR CONSTRUCTION—Continued

Clermont Sewer Pipe Co., Clermont
Blain Run Coal Co., Coalport
Evans Coal & Coke Co., Connellsville
Francis Coal Co., Connelton
Pittsburgh Coal Co., Coraopolis
Jos. Walton, Pittsburgh, Crafton Br. P. O.
McFetridge Bros. Coal Co., Creighton
Pittsburgh Plate Glass Co., Creighton
Penna. R. R. Co., Cresson
Ford Colliers Co., Curtsville
Washington Coal & Coke Co., Dawson
Dixonville Coal Co., Dixonville
George Minus, Jr., DuBois
Reed Colliery Co., Dudley
Dunbar Furnace Co., Dunbar
H. V. Lukens, Duncannon, R. D.
Oak Hill Coal Co., Duncott
Carney & Brown Coal Co., Scranton, Dunmore
Br. P. O.
Hillside Coal & Iron Co., Dunmore Br. P. O.
Keystone Mining Co., East Brady
Monarch Coal Co., East Brady
Springfield Coal Mining Co., Ebensburg
Boynton Coal Co., Elk Lick
Erie Car Works, Erie
Mizener Coal Co., Erie
Pittsburgh & Erie Coal Co., Erie
E. H. Campbell, Espyville
The Edward Dambach Co., Evans City
Jos. E. Thropp, Everett
Export Coal Co. (Hdqs. Pittsburgh), Export
The Struthers Coal & Coke Co., Fairbank
Eagle Coal Co., Fredell
Ben Franklin Coal Co., Freeport
Kerr Coal Company, Freeport
Buffalo & Susquehanna R. R., Galeton
The Taylor & McCoy Coal & Coke Co., Gallitzin
Enterprise Coal Co., Garrett
W. A. Merrill & Co., Garrett
W. R. McTurk Coal Co., Girardville
Cornell Coal Co., Glassmere
Graceton Coke Co., Graceton
Apollo Coal Co., Greensburg
Atlantic Crushed Coke Co., Greensburg
Juni-on Coal & Coke Co., Greensburg
Keystone Coal & Coke Co., Greensburg
J. C. Reed, Greensburg
Donohoe Coke Co., Greenwald
Mutual Coal Mining Co., Grove City
Standard Coal Mining Co., Grove City
Harleigh Broadwood Coal Co., Harleigh
Pond Creek Coal Co., Harleigh
Penna. R. R. Co., Harrisburg
Western Maryland Railway Co., Harrow
Red Top Coal Co., Hastings
Rich Hill Coal Co., Hastings
J. S. Wentz & Co., Hazelbrook
Evans Colliery Co., Hazleton
Harwood Coal Co., Hazleton
Hazel Mountain Coal Co., Hazleton
A. Pardee & Co., Hazleton
Estate of A. S. Van Winkle, Hazleton
Penn-Mary Coal Co., Hellwood
Hormel Coal Co., Hickman
Maple Ridge Coal Co., Holsopple
W. S. B. Hays, Homestead
Knickerbocker Smokeless Coal Co., Hooversville
Somerset Mining Co., Hooversville
Frelin Coal Co., Houtzdale
Ziegler Coal Co., Houtzdale
The Huntingdon & Broad Top M. R. R. & C.
Co., Huntingdon
Huntingdon Coal Co., Huntingdon
John Langdon, Huntingdon
Irwin Foundry & Car Co., Irwin
Broad Top Coal & Mineral Co., Jacob
G. B. Markee Co., Jeddo
N. Y. C. & H. R. R. Co., Jersey Shore
Humbert Coal Co., Jessup
Cambria Steel Co., Johnstown
Citizens' Coal Co., Johnstown
A. J. Haws & Sons, Johnstown
The Lorain Steel Co., Johnstown
Smokeless Coal Co., Johnstown
Somerset & Cambria Coal Co., Johnstown
Suppes Coal Co., Johnstown
Great Lakes Coal Co., Kaylor
Reading Iron Co., Kimmeltown
East Boston Coal Co., Kingston
The Kingston Coal Co., (Wilkes-Barre), Kings-
ton Br. P. O.
Allegheny River Mining Co., Kittanning
Stewart Coal Co., Knox Dale
Orenstein-Arthur Koppel Co., Koppel
Clearfield & Cambria C. & C. Co., LaJosa

F. A. Lane, Lanes Mills
Geo. W. Swartz, Langdondale
The Lehigh Coal & Navigation Co., Lansford
Latrobe-Connellsville Coal & Coke Co., Latrobe
Ligonier Coal Co., Latrobe
Unity Coal Co., Latrobe
Unity-Connellsville Coke Co., Latrobe
Widnoon Coal Mining Co., Lawsonham
Armstrong County Coal Co., Leechburg
West Leechburg Steel Co., Leechburg
Atlas Coke Co., Leetonia
Leetonia Lumber Co., Leetonia
Leetonia Railway Co., Leetonia
W. E. Brown & Co., Ligonier
Jas. Harris & Sons, Lilly
Leubey Coal Mining Co., Lilly
Meyersdale Coal Co., Listie
Lloydell Coal Mining Co., Lloydell
Logansport Coal Co., Logansport
Raridan & East Brady C. Co., Logansport
Northern Anthracite Coal Co., Lopez
Loyalhanna Coal & Coke Co., Loyalhanna
Brothers Valley Coal Co., Macdonaldton
Puritan Coke Co., McClellandtown
Bowman Bros. Co., McKeesport
Gatehouse & Shaft Coal Co., Madera
Thos. McGlynn, Madera
Johnetta Fdy. & Machine Co., Marianna
Pittsburgh & Butler Street Railway Co., Mars
Moosie Mountain Coal Co., Marshwood
Maryland Coal Co., Maryland
Spring Hill Coal Co., Mayfield
T. H. Wachua, Mayfield
Sharon Coal & Limestone Co., Mercer
Atlantic Coal Co., Meyersdale
Phillips Bros., Middleport
Middletown Car Co., Middletown
Americann Car & Foundry Co., Milton
Buck Run Coal Co., Minersville
Darkwater Coal Co., Minersville
Pine Hill Coal Co., Minersville
West End Coal Co., Mocanaqua
Wenona Coal Co., Monessen
Monongahela Saw & Plg. Mill Co., Monongahela
Dodson Coal Co., Morea Colliery
National Mining Co., Morgan
Morrisdale Coal Co., Morrisdale Mines
Penna. R. R. Co., Morrisdale
Shade Coal Mining Co., Mount Pleasant
E. J. Goodyear & Sons, Munson
Jim Ackley, New Albany
Fairmont Coal Co., New Bethlehem
The Leeburg Coal Co., New Castle
Standard Steel Car Co., New Castle
Valley Camp Coal Co., New Kensington
Fayette Coke Co., New Salem
Thompson Cville Coke Co., New Salem, R. D.
Penna. R. R. Co., Northumberland
National Transit Co. Shops, Oil City
East Broad Top R. R. & Coal Co., Orbisonia
Ghem Coal Co., Osceola Mills
Osceola Silica & Fire Brick Co., Osceola Mills
S. B. Stine, Osceola Mills
Lehigh Valley R. R. Co., Packerton
New Jersey Zinc Co., Palmerton
The Hedstrom Coal Mining Co., Parkers Landing
Good Clay & Coal Co., Patton
Mount Jessup Coal Co., Peckville
Pencoyd Iron Works, Pencoyd
Penfield Coal & Coke Co., Penfield
Hockensmith Wheel & Mine Car Co., Penns Sta-
tion
Alliance Coal Mining Co., 437 Chestnut St.,
Philadelphia
The Baldwin Locomotive Works, 500 N. Broad
St., Philadelphia
The T. G. Brill Co., 62nd & Woodland Ave.,
Philadelphia
Chestnut Ridge Coal Co., West End Trust Bldg.,
Philadelphia
Colonial Collieries Co., North American Bldg.,
Philadelphia
Cymbria Coal Co., 1000 Franklin Bank Bldg.,
Philadelphia
Dixon Coal Co., 727 Land Title Bldg., Philadel-
phia
Ebensburg Coal Co., 727 Land Title Bldg., Phila-
delphia
Forge Coal Mining Co., 1000 Franklin Bank
Bldg., Philadelphia
Glenwood Coal Co., 1000 Franklin Bank Bldg.,
Philadelphia
Hale & Kilburn Co., 18th St. & Lehigh Ave.,
Philadelphia

CAR CONSTRUCTION—Continued

Highland Coal Mining Co., Real Estate Trust Bldg., Philadelphia
 Logan Coal Co., Harrison Bldg., Philadelphia
 Loyalhanna Coal & Coke Co., Land Title Bldg., Philadelphia
 Lehigh & Wilkes-Barre Coal Co., 716 Reading Terminal, Philadelphia
 Nanty Glo Coal Mining Co., 727 Land Title Bldg., Philadelphia
 Northern Central Railway, Philadelphia
 Pennsylvania R. R., West Philadelphia, Philadelphia
 Philadelphia Rapid Transit Co., Land Title Bldg., Philadelphia
 Phila. & West Chester Railway Co., Philadelphia
 W. H. Piper & Co., Real Estate Trust Bldg., Philadelphia
 Plymouth Coal Mining Co., Real Estate Trust Bldg., Philadelphia
 Shoemaker Coal Mining Co., 1507 Real Estate Trust Bldg., Philadelphia
 South Fork Coal Mining Co., Bullitt Bldg., 421 Chestnut St., Philadelphia
 Sterling Coal Co., 421 Chestnut St., Philadelphia
 Urey Ridge Coal Co., 1000 Franklin Bank Bldg., Philadelphia
 Ashman Coal Co., Phillipsburg
 Atherton-Barnes Co., Phillipsburg
 Madefra-Hill Coal Mining Co., Phillipsburg
 R. H. Mull, Phillipsburg
 Victoria Coal Mining Co., Phillipsburg
 Wicks Bros. Coal Co., Phillipsburg
 Pennsylvania Railroad, Pitscairn
 Allegheny & Southern R. R. Co., Second Ave. & Ross St., Pittsburgh
 Baltimore & Ohio R. R. Co., Glenwood Shops, Pittsburgh
 Bessemer Coal & Coke Co., 2212 Oliver Bldg., Pittsburgh
 Bessemer Coke Co., Oliver Bldg., Pittsburgh
 Blaine Coal Co., Fulton Bldg., Pittsburgh
 Bolivar Coal & Coke Co., Pittsburgh
 Buffalo, Rochester & Pittsburgh Ry. Co., Pittsburgh
 Carnegie Coal Co., 1315 Paix Bldg., Pittsburgh
 Diamond Coal & Coke Co., 1110 House Bldg., Pittsburgh
 The Fayette Coal Co., Fourth Ave. & Wood St., Pittsburgh
 James T. Fox, 121 Wabash St., Pittsburgh
 H. C. Frick Coke Co., Pittsburgh
 John M. Greek & Co., 510 Park Bldg., Pittsburgh
 Hostetter Connellsville Coke Co., Pittsburgh
 Isabella Connellsville Coke Co., Fifth Ave. & Wood St., Pittsburgh
 Jenner-Quemahoning Coal Co., First Nat'l Bank Bldg., Pittsburgh
 Middletown Car Co., Frick Bldg., Pittsburgh
 Montour R. R. Co., Pittsburgh
 Monongahela River Cons. Coal & Coke Co., Smithfield St., Pittsburgh
 Mountain Smokeless Coal Co., 2204 Oliver Bldg., Pittsburgh
 Naomi Coal Co., First Nat'l Bank Bldg., Pittsburgh
 Oliver & Snyder Steel Co., South Tenth & Muriel Sts., Pittsburgh
 Penn. & Lake Erie R. R., Pittsburgh
 Pennsylvania Railroad, 32nd & Carson Sts., Pittsburgh
 Phillips Mine & Mill Supply Co., 2227 Jane St., S. S., Pittsburgh
 Pittsburgh-Baltimore Coal Co., First National Bank Bldg., Pittsburgh
 Pittsburgh-Buffalo Co., Fourth floor Frick Bldg., Pittsburgh
 Pittsburgh Coal Co., Smithfield St., Pittsburgh
 Pittsburgh-Westmoreland Coal Co., Fulton Bldg., Pittsburgh
 H. K. Porter Co., 49th St. & A. V. Ry., Pittsburgh
 Preston Coal Co., Fulton Bldg., Pittsburgh
 Pressed Steel Car Co., Pittsburgh
 J. H. Sanford Coal Co., 1315 Park Bldg., Pittsburgh
 Somerset-Smokeless Coal Co., First Nat'l Bank Bldg., Pittsburgh
 United Coal Co., First Nat'l Bank Bldg., Pittsburgh
 United Connellsville Coke Co., Oliver Bldg., Pittsburgh
 The Vesta Coal Co., Third Ave. & Ross St., Pittsburgh
 Wabash Pittsburgh Ter. Ry. Co., Liberty & Ferry Sts., Pittsburgh

James Walton, Crafton (Br. P. O.), Pittsburgh
 McCauley Coal Co., Pittston
 Yost Mining Co., Pittston
 Parrish Coal Co., Plymouth
 The Penker Coal Co., Portage, R. D.
 Union Railroad Co., Port Perry
 Penna. R. R. Co., Pottsville
 The Phila. & Reading Coal & Iron Co., Pottsville
 Anita Coal Mining Co., Punxsutawney
 Bowersville Coal Co., Punxsutawney
 John McLeavy & Co., Punxsutawney
 Punxsutawney Coal Mining Co., Punxsutawney
 Punxsutawney Fdy. & Machine Co., Punxsutawney
 Colonial Coal Co., Puritan
 Geo. Pearce & Sons, Puritan
 Bulah Shaft Coal Co., Ramey
 Girard Mammoth Coal Co., Ravenrun
 Philadelphia & Reading Ry. Co., Reading
 Jermyn & Co., Rendham
 Hugh McHugh, Rennerdale
 Penna. R. R. Co., Renovo
 Russell Car & Iron Plow Co., Ridgway
 Brandenburg Coal Mining Co., Rockwood
 Irvona Coal & Coke Co., Saint Clair
 Butcher Creek Coal Co., Saint Clair
 Mount Hope Coal Co., Saint Clair
 Saint Clair Coal Co., Saint Clair
 Shawmut Mining Co., Saint Marys
 Cochran Coal Co., Salina
 Bowman Coal Mining Co., Saltsburg
 M. S. Kemmerer & Co., Sandy Run
 E. Elchberger & Co., Saxton
 Lehigh Valley Railroad Co., Sayre
 Lincoln Coal & Coke Co., Scottsdale
 Bulls Head Coal Co., Scranton
 Carney & Brown Coal Co., Dunmore, Scranton
 Delaware, Lackawanna & Western R. R. Co., Scranton
 Dolph Coal Co., Ltd., Scranton
 Hillside Coal & Iron Co., Dunmore, Scranton
 Lackawanna & Wyoming Valley R. R. Co., Scranton
 Nay Aug Coal Co., Scranton
 Pennsylvania Coal Co., Dunmore, Scranton
 People's Coal Co., Scranton
 Scranton Coal Co., Scranton
 Traders' Coal Co., Scranton
 Oxford Coal Co., Shaft
 H. H. Smith Co., Shaft
 Greenough Red Ash Coal Co., Shamokin
 Shipman Coal Co., Shamokin
 Pardoe Coal Co., Sharon
 Westerman Filer Co., Sharon
 Shawmut Vitriol Paving Brick Works, Shawmut
 Tionesta Valley Railroad Co., Sheffield
 Thomas Colliery Co., Shenandoah
 James M. McIntyre, Six Mile Run
 Schipper Bros Coal Mining Co., Six Mile Run
 Baxter Ridge Coal Co., Smithfield
 H. R. Sackett C. & C. Co., Smithfield
 Smithfield Coal & Coke Co., Smithfield
 Clark Bros. Coal Mining Co., Smokerun
 Leland Coal Mining Co., Smokerun
 W. A. Barron, Somerset, R. D.
 Consolidation Coal Co., Somerset
 Sonman Shaft Coal Co., Sonman
 H. C. Stineman, South Fork
 O. M. Stineman, South Fork
 Detinger Bros., Spangler
 Woodland Coal & Coke Co., Spangler
 Mercer Iron & Coal Co., Stoneboro
 H. K. Underwood, Strattonville
 New York, Susquehanna & Western R. R. Co., Stroudsburg
 Moses Neyer, Summithill
 East Deer Coal Co., Tarentum
 Price-Pancoast Coal Co., Throop
 Susquehanna & New York R. R. Co., Towanda
 Upper Lehigh Coal Co., Upper Lehigh
 Browning Coke Co., Uniontown
 Brownsville Coke Co., Uniontown
 Hustead-Semans Coal & Coke Co., Uniontown
 Magee Coke Co., Uniontown
 Mount Hope Coke Co., Uniontown
 Newcomer Coke Co., Uniontown
 W. J. Parshall, Uniontown
 Prospect C. & C. Co., Uniontown
 Shannon C. & C. Co., Uniontown
 South Fayette Coke Co., Uniontown
 Sunshine Coal & Coke Co., Uniontown
 Tower Hill Connellsville Coke Co., Uniontown

CAR CONSTRUCTION—Continued

Waltersburg Coke Co., Uniontown
 Whyel Coke Co., Uniontown
 Pennsylvania R. R., Verona
 Vinton Colliery Co., Vintondale
 Oakes Bros. Coal Co., Volant, R. D.
 Genuine Connellsville Coke Co., Waltersburg
 Beaver Coal & Coke Co., Waupum
 Waynesburg & Washington Railroad Co., Waynesburg
 Lackawanna Coal & Coke Co., Wehrum
 A. J. Lundquist & Co., Wellsboro, R. D.
 Midvalley Coal Co., Wilburton
 Standard Moshaunon Coal Co., Williamsport
 Central R. R. Co. of New Jersey, Ashley, Wilkes-Barre
 Lehigh Valley Coal Co. & Cox Bros. & Co., Inc., Wilkes-Barre
 Morris Run Coal Mining Co., Wilkes-Barre
 W. H. Shepherd & Son, Wilkes-Barre
 Susquehanna Coal Co., Wilkes-Barre
 Vulcan Iron Works, Wilkes-Barre
 The Shenango Furnace Co., Wilpen

Berwind-White Coal Mining Co., Windber
 Rummel Coal Mining Co., Windber
 Carnwath Coal Co., Winburne
 Cascade Coal & Coke Co. (Mines at Tyler and Sykesville, Penn.), Buffalo, N. Y.
 Jefferson & Clearfield Coal & Iron Co., Rochester, N. Y.
 Rochester & Pittsburgh Coal & Iron Co., Rochester, N. Y.
 Allegheny Coal Co. (Mines at Cheswick, Penn.), Cleveland, Ohio
 Warren-Leonard Coal Co., Cleveland, Ohio
 Warner-Youghiogheny Coal Co., Cleveland, Ohio
 The Youghiogheny & Ohio Coal Co., Cleveland, Ohio
 Island Run Coal Co., East Liverpool
 Atlas Coke Co. (Works at Helen, Penn.), Leetonia, Ohio
 McKeefer Coal Co., Leetonia, Ohio
 LaBelle Coke Co., Steubenville, Ohio
 The Witch Hazel Coal Co., Youngstown, Ohio

CASKETS AND COFFINS

Bangor Casket Mfg. Co., Bangor
 Boyertown Burial Casket Co., Boyertown
 Erie Burial Case Co., Erie
 F. H. Campbell, Espsville
 The Freedom Casket Co., Freedom
 Harrisburg Burial Case Co., Harrisburg
 Hazleton Mfg. Co., Hazleton
 J. S. Claypool Lbr. Co., Kittanning
 J. D. Bowers, New Holland
 J. C. Henninger, New Holland
 Penna. Burial Case Co., Reynoldsville
 Riegelsville Mfg. Co., Riegelsville
 C. L. Wilmot, Rome

A. & J. Janton, 1408-10 N. Eleventh St., Philadelphia
 The Paxson & Comfort Co., 529 Arch St., Philadelphia
 National Casket Co., 733 Chartiers St., North Diamond Sta., Pittsburgh
 C. G. Sellers, Saint Thomas
 United States Casket Co., Scottsdale
 John Benore, Scranton
 Sunbury Coffin and Casket Co., Sunbury
 Sunderland Lumber Co., Sunbury
 Bischoff Estate, Tamaqua
 Charles Fritz, Weisenburg
 L. B. Lacey, West Auburn

CHAIRS AND CHAIR STOCK

Boehm & Spiegel Co., Allentown
 Johnston & Swartz, Allentown
 The Yeager Furniture Co., Allentown
 A. C. Kelly, Center Moreland
 Clearfield Wooden-Ware Co., Inc., Clearfield
 Coraopolis Mfg. Co., Coraopolis
 Corry Chair Co., Corry
 U. S. Chair Co., Corry
 Keystone Handle Co., Corydon
 J. D. Westcott & Son, Endeavor
 B. T. Beers, Fallentimber
 Kurtz Furniture Co., Fullerton
 Greensburg Swing Co., Greensburg
 American Chair Manufacturing Co., Hallstead
 Wm. Kemper, Hampton
 Jesse Wolford, Hunterstown
 Indiana Bent Rung Ladder Co., Indiana
 W. DeFrehn & Sons, Johnstown
 Emporium Lumber Co., Keating Summit
 Salmon Creek Lumber Co., Kellettville
 Penn. Swing & Ladder Co., Lancaster
 Lewisburg Chair Co., Lewisburg
 Lehtaler Bros., Loleta
 Glen Maw Novelty Works, Mawrglen
 Willson-Bennett-Porter Co., Montoursville
 James Barker, Inc., Sixth & Cayuga, Philadelphia
 Bloch Go-Cart Co., 1136-48 N. American St., Philadelphia

Bodenstein & Knemmerle, Inc., Lawrence St. & Girard Ave., Philadelphia
 James W. Cooper Co., 1706-20 Washington Ave., Philadelphia
 John Grass Wood Turning Co., 222 Vine St., Philadelphia
 J. Hetherington, 206 Quarry St., Philadelphia
 Sikes Furniture Co., 23rd & Passyunk, Philadelphia
 I. H. Wisler & Son, 223 & 225 N. Sixth St., Philadelphia
 A. G. Pera, 5958 Baum St., Pittsburgh
 Pittsburgh Hardwood Working Co., 34 Water St., Pittsburgh
 M. M. Whetstone, Schellsburg
 Mayes Novelty Factory, Sonestown
 The Tidionte Rocker Co., Ltd., Tidionte
 Titusville Elastic Chair Co., Titusville
 Titusville Handle Co., Titusville
 The Shreve Chair Co., Union City
 Standard Chair Co., Union City
 The Union City Chair Co., Union City
 Variety Turning & Furn. Mfg. Co., Union City
 Samuel Peterson, Warren
 F. B. Sherman, Williamsburg
 J. K. Rishel Furniture Co., Williamsport
 Simmons Wood Working Co., Williamsport
 D. N. Byers, Woodbury

CLOCKS

Then Pen Argyll Clock Case Co., Pen Argyll
 American Cuckoo Clock Co., 1665 Ruffner St., Philadelphia

Fred Frick Clock Co., Waynesboro

DAIRYMEN'S, POULTERERS' AND APIARISTS' SUPPLIES

Charles Incubator Co., Columbia
 F. E. Westby, Corry
 Prairie State Incubator Co., Homer City
 W. S. Wilcox, Turnersville, Jamestown P. O.
 Dairymen's Supply Co., Lansdowne

W. R. Wilcox, Lawrenceville
 Roller Tray Incubator Co., Northampton
 Phoenixville Mch. Co., Phoenixville
 The Sharples Separator Co., West Chester
 H. W. White, Whites Valley

ELEVATORS

Sprout, Waldron & Co., Muncy
 The Albright Elevator Co., Seventh St. & Glenwood Ave., Philadelphia
 Atlas Elevator Co., 611 Cherry St., Philadelphia
 Eastern Elevator Co., 223 Callowhill, Philadelphia

Energy Elevator Co., 218 New St., Philadelphia
 Walter E. Goodman, 922 Callowhill, Philadelphia
 Independence Elevator Co., 710 Cherry, Philadelphia
 Keystone Elevator Co., 23rd & Sansom Sts., Philadelphia

*These companies have collieries in Pennsylvania.

ELEVATORS—Continued

Oneida Elevator Co., 733 Cherry St., Philadelphia
 O'Neill Elevator Co., 628 Cherry St., Philadelphia
 Otis Elevator Co., 1105 Frankford Ave., Philadelphia

Supplee Elevator Co., 3207 Spring Garden, Philadelphia
 Marshall Bros. 21st & Mary Sts., S. S., Pittsburgh
 John G. Speidel, Reading

EQUIPMENT, PLAYGROUND

Noll Bros. & Smith, Bausman
 Bullock Swing & Chair Mfg. Co., Inc., Bellefonte
 Hertzler & Zook Co., Belleville
 Clearfield Novelty Works, Clearfield
 Clearfield Woodenware Co., Inc., Clearfield
 Cornopolis Mfg. Co., Cornopolis
 Standard Novelty Works, Duncannon
 East Greenville Mfg. Co., East Greenville
 A. Buch's Sons Co., Elizabethtown
 Greensburg Swing Co., Greensburg

McKay Gilmore Furniture Co., Grove City
 Penn Swing & Ladder Co., Lancaster
 Glen Mawr Novelty Works, Mawrglen
 Eclipse Pulley Co., Meyersdale
 Penn Wheelbarrow Co., 4741 Kansas St., Pittsburgh
 R. M. Bowser & Son, Renfrew
 The Specialty Mfg. Co., Titusville
 J. C. McQuaid, West View
 Keystone Farm Machine Co., York

EXCELSIOR

J. K. Hornbeck, Equinunk
 Hotchkiss & Son, Lawrenceville
 Gornley Brothers, Hoadleys

Handle & Excelsior Co., Picture Rocks
 Prompton Excelsior Co., Prompton
 M. Elmore, White Mills

FIXTURES

Anton Loeper, Ashland
 Adam Waldner, Ashland
 Penn. R. R. Car Shops, Altoona
 Kurtz Bros., Bethlehem
 Hoover Bros. Mfg. Co., Berksburg
 A. B. Hartman, Bloomsburg
 Federal Equipment Co., Carlisle
 Walton Lumber Co., Charleroi
 St. Francis Industrial School, Eddington
 Exhibition Show Case Co., Erie
 Johannesen Mfg. Co., Erie
 M. Schultz, Gallitzin
 Glen Mfg. Co., Glen Rock
 L. B. Walbert, Hancock
 Henry Shaffer Lumber Co., Kittanning
 The Wohlseu Planing Mill Co., Lancaster
 H. E. Walters, Middleburg
 Middletown Furniture Co., Middletown
 Montgomery Table Works, Montgomery
 Stokes Mfg. Co., Montgomery
 Busch & Co., 402 Cherry, Philadelphia
 B. Bernheim & Sons, 1401 N. Third St., Philadelphia
 Meyer Cossoy, 624 Filbert St., Philadelphia
 John Ernst & Co., 2208 Germantown Ave., Philadelphia
 J. Fisher & Co., 1216-18 N. Fifth St., Philadelphia
 Chas. C. Geissler, 62 N. Fourth St., Philadelphia
 Interior Milling Co., 2531 Poplar St., Philadelphia
 Irons Co., 1401 Germantown Ave., Philadelphia
 Karcher & Rehn Co., Twelfth & Hamilton Sts., Philadelphia
 Kasansky & Bloom, 231-33 N. Lawrence St., Philadelphia
 Stephen F. Ketran, 12 S. 24th St., Philadelphia
 Keystone Display Rack Co., 1132 Parrish, Philadelphia
 J. Kirchhof & Co., 448 N. Twelfth St., Philadelphia
 Francis D. Kramer, 1601 Spring Garden St., Philadelphia
 A. H. & F. H. Lippincott, Inc., 24th & Locust Sts., Philadelphia
 George E. Lucas, 2013 Montgomery Ave., Philadelphia
 John J. McCloskey, 149 N. Fourth St., Philadelphia
 Mallock & Coddington, 611 Cherry St., Philadelphia
 Miller & England Co., 1124-32 Washington Ave., Philadelphia
 Northern Central Railway (Address, Mt. Vernon Car Shop, Baltimore, Md.), Philadelphia
 Pennsylvania Store Fixture Co., 1304 N. Second St., Philadelphia
 Julius A. Raith's Sons, 304 Master St., Philadelphia
 Ridgway Refrig. Co., 3519 N. Lawrence St., Philadelphia
 William Russell Woodworking Co., 3015-29 Chestnut St., Philadelphia

Harry R. Rust, 724-26 Ludlow St., Philadelphia
 Sanitary Specialties Co., 1824 E. Clearfield St., Philadelphia
 C. J. & A. Schad, 519 Bainbridge St., Philadelphia
 Segall & Son, 720 Jefferson St., Philadelphia
 Louis Sher, 2132 S. Eighth St., Philadelphia
 Silberman & Fleisher, 1218 Mascher, Philadelphia
 John E. Sjostrom Co., Inc., 1719 N. Tenth St., Philadelphia
 Smedley Bros. Co., Church & Tacony Sts., Philadelphia
 H. Dan'l Sorg, S. W. cor. Front & Montgomery Aves., Philadelphia
 Robert Tarlo & Son, 413-17 S. Fifth St., Philadelphia
 H. Tiedemann, N. W. cor. Nineteenth St. & Washington Ave., Philadelphia
 V. W. Mfg. Co. (John B. Vernon, Partner), 1616 North St., Philadelphia
 Harry Walter, 1711 N. 31st St., Philadelphia
 Weisner, Weis & Co., 240 Cherry St., Philadelphia
 A. Wilt & Sons, 721 N. Front St., Philadelphia
 Frederick V. Yeager, 9-13 S. 36th St., Philadelphia
 P. R. R. Co., Pitcairn
 Barnes Safe & Lock Co., 327 Third Ave., Pittsburgh
 S. Delp's Sons, Fourth & Liberty, Pittsburgh
 Bernard Gloekler Co., 1127 Pennsylvania Ave., Pittsburgh
 Kates & Co., Grant Block, Pittsburgh
 Kund & Eiber Mfg. Co., 204-24 Warrington Ave., Pittsburgh
 Geo. B. Monks Co., 8-10 Ketchum, Pittsburgh
 National Electric Shoe Shining Mch. Co., 422 First St., Pittsburgh
 Pittsburgh Hardwood Working Co., 33-34 Water St., Pittsburgh
 P. & L. E. R. R., Pittsburgh
 Union R. R. Co., Port Perry
 Josiah Frederick, Pottstown
 Penna. R. R. Co., Pottsville
 R. M. Bowser & Son, Renfrew
 The Woodwork Supply Co., Reynoldsville
 John Benore, Scranton
 Brown Bros., Scranton
 Peck Lbr. Mfg. Co., Scranton
 Valverde Mfg. Co., Scranton
 J. R. Newbold & Co., Sellersville
 The National Malleable Castings Co., Sharon
 Bethlehem Steel Co., South Bethlehem
 Bischoff Estate, Tamaqua
 Penna. R. R., Verona
 Meas Furniture Co., Warren
 Warren Veneer & Panel Co., Warren
 E. T. Long & Co., Wilkes-Barre
 F. B. Sherman, Williamsburg
 Dittmar Furniture Co., Williamsport
 Geo. W. Gilbert, York
 George A. Swartz, York
 Youngsville Mfg. Co., Youngsville

FRAMES AND MOLDING, PICTURE

Wyman Kimble Planing Mill, Honesdale
 William G. Hermann, 1111 Ridge Ave., Philadelphia
 Kirkpatrick Mfg. Co., Third St. & Glenwood Ave., Philadelphia
 J. E. McClees & Co., 1507 Walnut, Philadelphia

Conroy Prugh Co., 1430-36 Western Ave., N. S., Pittsburgh
 American Slate Works, Slatington
 National School Slate Co., Slatington
 L. M. Castner, Williamsport

FURNITURE

Keystone Mfg. Co., Albion
 G. H. Bear Furniture Co., Allentown
 Gottlieb Buehler & Co., Allentown
 C. A. Dorney Furn. Co., Allentown
 Johnston & Swartz, Allentown
 E. J. Schneck & Sons, Allentown
 The Yeager Furniture Co., Allentown
 Penna. R. R. Car Shops, Altoona
 M. Poet & Son, Altoona
 John E. Caruso, Ardmore
 Athens Furniture Co., Athens
 Hoover Bros. Mfg. Co., Berksburg
 A. B. Hartman, Bloomsburg
 Hawley-Slate Furn. Co., Bloomsburg
 A. D. Deemer Furniture Co., Brookville
 H. Crawford & Sons, Canton
 Minnequa Furn. Co., Canton
 H. J. & W. A. Krumenacker, Carrolltown
 P. Nicklas' Sons, Chambersburg
 Henry Slerer & Co., Chambersburg
 E. M. Smith, Chambersburg
 Keystone Cabinet Co., Chester
 The New Farson Mfg. Co., Chester
 Penn Furniture Co., Conneautville
 Cornopolis Mfg. Co., Cornopolis
 K-P-L Furniture Mfg. Co., Corry
 J. P. Else, Cowan
 Dallastown Furniture Co., Dallastown
 R. M. Prowles, Dry Run
 East Greenville Mfg. Co., East Greenville
 Rutter Bros., Turtle Creek, East Pittsburgh
 Brown Furniture Co., East Stroudsburg
 B. F. Beers, Fallentimber
 Kurtz Furniture Co., Fullerton
 Garland Furniture Co., Garland
 Reaser Furniture Co., Gettysburg
 Dize Furniture Co., Glen Rock
 Enterprise Furniture Co., Glen Rock
 Hess Brothers, Grantville
 J. C. Reed, Greensburg
 Daniel A. Burke & Sons, Hamburg
 Hanover Cabinet Co., Hanover
 Long Furniture, Hanover
 Penna. R. R. Co., Harrisburg
 S. A. Huntsinger, Hegins
 Penwarden Mfg. Co., Honesdale
 Hughesville Furniture Co., Hughesville
 Indiana Bent Rung Ladder Co., Indiana
 Henry Shaffer Lumber Co., Kittanning
 Lebanon Valley Furniture Co., Lebanon
 Leighton Lumber Co., Leighton
 LeRaysville Furniture & Toy Mfg. Co., LeRaysville
 Lowry & Akeman, Ligonier
 C. F. Bucher, Littlestown
 Clinton Furniture Co., Lock Haven
 Wm. S. Clevenger, McConnellsburg
 M. T. Wertz, Malta
 Mansfield Novelty Works, Mansfield
 Chas. Neast & Co., Mauch Chunk
 Mill Run Lumber Co., Meadville
 West Branch Novelty Co., Milton
 Isaac C. Decker, Montgomery
 Montgomery Lounge Co., Montgomery
 Montgomery Table Works, Montgomery
 Montgomery Mfg. Co., Montgomery
 Stokes Mfg. Co., Montgomery
 Berry Bros., Montoursville
 Crandall-Bennett-Porter Co., Montoursville
 Woolever Bros., Montoursville
 Mount Wolf Furniture Co., Mount Wolf
 Muncy Mfg. Co., Ltd., Muncy
 J. D. Bowers, New Holland
 J. C. Hennings, New Holland
 Lillo Bros. Co., Oakdale
 J. G. Moyer & Sons Co., Perkaskie
 American Cabinet Works, 227 Buttonwood St., Philadelphia
 James Barker, Inc., Sixth & Cayuga, Philadelphia
 Jacob Behrend, 124 W. Allen St., Philadelphia
 George W. Brenn, 1306-08 N. Marshall, Philadelphia
 Burt Brothers, 2000 S. Ninth St., Philadelphia
 James W. Cooper Co., 1706-20 Washington Ave., Philadelphia
 Henry Dilg, 828 Wood St., Philadelphia

John A. Dabs, 269 S. Fifth St., Philadelphia
 Ebert Furniture Co., Sixth & Moore Sts., Philadelphia
 Christian Gebert, 141 E. Cumberland St., Philadelphia
 John Grass Wood Turning Co., 222 Vine St., Philadelphia
 Hale & Kilburn Co., 18th & Lehigh Ave., Philadelphia
 J. S. Hardig & Son, 5109 Germantown Ave., Germantown, Philadelphia
 Hoebling Bros., 314 S. Lawrence, Philadelphia
 G. Horn & Co., 422 N. Orianna St., Philadelphia
 Walter E. Hunt, 1615 Chestnut St., Philadelphia
 Peter Josten, 1014 N. Third Ave., Philadelphia
 Kasansky & Bloom, 231-233 Lawrence St., Philadelphia
 Kaufmann Mfg. Co., 710-12 N. Percy St., Philadelphia
 Ferdinand Keller, 216-24 S. Ninth St., Philadelphia
 John Knoell & Sons, 171 Jefferson St., Philadelphia
 Henry Krann Furniture Co., Sixth & Master Sts., Philadelphia
 Lincoln Furniture Co., 415 Brown St., Philadelphia
 McCracken & Hall, 1120 Washington Ave., Philadelphia
 Thos. Mills & Bro., Inc., 1301 N. Eighth St., Philadelphia
 Peter C. Osada & Co., 1422 S. Front St., Philadelphia
 Page & Rainey, 230 S. Second St., Philadelphia
 Morris Platt & Co., 1406 S. Front St., Philadelphia
 Pooley Furniture Co., Indiana Ave., 16th & 17th Sts., Philadelphia
 John H. Ragatz & Son, 212 Chancellor St., Philadelphia
 Henry H. Sheip Mfg. Co., N. E. Cor. Sixth St. & Columbia Ave., Philadelphia
 A. Wagenbaur, 534 N. Second St., Philadelphia
 The Winner Co., 2035-45 N. Seventh St., Philadelphia
 Burrows Bros. & Co., Ltd., Picture Rocks
 John P. Little Co., Picture Rocks
 Colonial Art Furniture Co., 3906 Fifth Ave., Pittsburgh
 Dauler, Close & Johns, 636 Smithfield St., Pittsburgh
 D. DeSimone, 230 Lorimer Ave., Pittsburgh
 Julius Eisenberger, 560 Homewood Ave., Pittsburgh
 Eastend Art Furniture Co., 4524 Forbes St., Pittsburgh
 A. G. Pera, 5558 Baum St., Pittsburgh
 Pittsburgh Hardwood Working Co., 33-34 Water St., Pittsburgh
 H. N. Twitmyer, Pleasant Gap
 Sieling Furniture Co., Railroad
 Philadelphia & Reading R. R. Co., Reading
 Red Lion Furniture Co., Red Lion
 Noah C. Stabley, Red Lion
 C. G. Sellers, Saint Thomas
 M. M. Whetstone, Schellsburg
 Charles S. Metzgar, Sciota
 Robinson Bros., Sharpville
 Boher & Phillips, Shippensburg
 Peerless Furniture Co., Shippensburg
 Shippensburg Table & Mfg. Co., Shippensburg
 Shrewsbury Furniture & Mfg. Co., Shrewsbury
 Pennsylvania State College, State College
 Stewartstown Furniture Co., Stewartstown
 Tillman Hontz, Summithill
 Sunbury Table Works, Sunbury
 Tidloite Furniture Mfg. Co., Tidloite
 J. O. Frost's Sons, Towanda
 Benl. Danahover, Trexler
 W. F. Dildine, Turbotville
 Rutter Bros., East Pittsburgh, Turtle Creek Br. P. O.
 Loomis Table & Furniture Co., Union City
 The Novelty Wood Works Co., Union City
 Variety Turning & Furniture Mfg. Co., Union City

FURNITURE—Continued

Elmer Yingling, Waynesboro
Conewango Furniture Co., Warren
Geo. L. Folkman, Warren
Meas Furniture Co., Warren
Phenix Furniture Co., Warren
Warren Table Works, Warren
Watson Table & Furniture Co., Watson
Eureka Mfg. Co., Weissport
F. B. Sherman, Williamsburg
A. H. Heilman & Co., Williamsport
Keystone Furniture Co., Williamsport

National Furniture Co., Williamsport
J. K. Rishel Furniture Co., Williamsport
Williamsport Furniture Co., Williamsport
D. N. Byers, Woodbury
H. E. Boring & Bro., York
Home Furniture, York
Keystone Farm Machine Co., York
P. A. Furniture Co., York
West York Furniture Mfg. Co., York
Forest Furniture Mfg. Co., Youngsville
Youngsville Mfg. Co., Youngsville

GATES AND FENCING

Chester Fence Co., Chester Heights
Rutter Bros., Turtle Creek, East Pittsburgh
Evan Moore, Elwyn
Henry Shaffer Lumber Co., Kittanning
Northern Central Railway (Address, Mt. Vernon
Car Shop, Baltimore, Md.), Philadelphia

East End Planing Mill Co., Sexton
Rutter Bros., East Pittsburgh, Turtle Creek
Br. P. O.
Geo. W. Gilbert, York

HANDLES

Penna. R. R. Car Shops, Altoona
J. L. McLaughlin & Sons, Bedford
Hertzler & Zook Co., Belleville
Cumberland Valley R. R. Co., Chambersburg
M. B. Landis & Co., Coopersburg
Codorus Handle Co., Codorus
Keystone Handle Co., Corydon
E. H. Leathers, Curtin
Ringer & Co., Delmont
C. Prouty & Co., Eldred
J. H. Young Lumber Co., Emlenton
J. D. Westcott & Son, Endeavor
Theo. J. Ely Mfg. Co., Erie
Erie City Mfg. Co., Erie
Washburn Mfg. Co., Erie
F. H. Campbell, Espyville
Penna. Saw Co., Frackville
Marsteller Bros. Lumber Co., Fredonia
Girard Wrench Mfg. Co., Girard
M. D. Hoke, Hokes Mills
Howard Handle & Spoke Co., Howard
The L. C. Hasinger Co., Indiana
Robinson & Stryke, Keating Summit
Sheldon Handle Co., Kinzua
Lehentaler Bros., Loleta
American Fork and Hoe Co., North Girard
Penn Mfg. Co., North Girard
Hammond & Son, Ogontz
J. G. Moyer & Sons Co., Perkase

The John Buckley Hub, Spoke & Wheel Co.,
969-975 N. Second St., Philadelphia
Chas. P. Foulkrod, 2235 Wood St., Philadelphia
Germantown Tool Works, 518 Commerce St.,
Philadelphia
John Grass Wood Turning Co., 222 Vine St.,
Philadelphia
Nelms Co., 407 Commerce St., Philadelphia
N. C. Railway (Address, Mt. Vernon Car Shop,
Baltimore, Md.), Philadelphia
Thomas Ott & Co., 1124-1132 Washington Ave.,
Philadelphia
Leon Rozzen, 1003 N. Second St., Philadelphia
Handle & Excelsior Co., Picture Rocks
The J. C. Russell Shovel Co., 336 Fourth Ave.,
Pittsburgh
F. F. Childs, Pittsfield
Colebrookdale Iron Co., Pottstown
Reading Wood Pulley Co., Reading
Wm. Rose & Bros., Sharon Hill
Bethlehem Steel Co., South Bethlehem
Geo. H. Lancaster, South Sterling
L. Hammond, Spangler
Titusville Handle Co., Titusville
Fred Cafilisch, Union City
The Star Handle Co., Union City
Union Furnace Handle Co., Union Furnace
Samuel Peterson, Warren
Chas. Fritz, Weisenburg
F. B. Sherman, Williamsburg

INSTRUMENTS, MUSICAL

A. B. Feltmaker Organ Co., Erie
A. Gottfried & Co., Erie
Kellner Piano Co., Hazleton
Miller Organ & Piano Co., Lebanon
Rates & Culley, 706-18 Mercy St., Philadelphia
Cunningham Piano Co., 4948 Parkside Ave.,
Philadelphia
C. S. Haskell, 1520-22 Kater St., Philadelphia

Kinetic Engineering Co., 60th & Baltimore Ave.,
Philadelphia
The Lester Piano Co., 1306 Chestnut, Philadel-
phia
Painter & Ewing, 1106 Spring Garden, Philadel-
phia
Chas. F. Durner, Quakertown
Weaver Organ & Piano Co., York

INSTRUMENTS, PROFESSIONAL AND SCIENTIFIC

Penna. R. R. Co. (Foundries), Altoona
Logan Iron & Steel Co., Burnham
Theo. Alteneder & Sons, 945 Ridge Ave., Phila-
delphia
Charles A. Anderson, 1629 N. Tenth St., Phila-
delphia
Nathan Cohen, 1126 N. Orianna, Philadelphia
John Grass Wood Turning Co., 222 Vine St.,
Philadelphia
T. H. Grigg, Lancaster Ave. & Baring St.,
Philadelphia

Joseph B. Levy, 1429 21st St., Philadelphia
Lippincott Pencil Co., 220 N. 23rd St., Phila-
delphia
Thos. Mills & Bro., Inc., 1301 N. Eighth St.,
Philadelphia
Smedley Bros. Co., Church & Tacony Sts., Frank-
ford, Philadelphia
Martin H. Walrath, Broad & Cambria Sts.,
Philadelphia
Bethlehem Steel Co., South Bethlehem
Verona Tool Works, Verona

INSULATOR PINS AND BRACKETS

The L. C. Hasinger Co., Indiana
Robinia Pin Co., Newville

S. J. Bailey, Nicholson
J. W. Endsley, Somersfield

LADDERS

Apollo Step Ladder Co., Apollo
Coraopolis Mfg. Co., Coraopolis
American Mfg. & Novelty Co., Erie
Indiana Bent Rung Ladder Co., Indiana
Penna. Swing and Ladder Co., Lancaster
Pencoyd Iron Works, Pencoyd

Nathan Cohen 1126 N. Orianna, Philadelphia
John P. Little Co., Picture Rocks
Acme Mfg. Co., Marshall Ave., N. S., Pitta-
burgh
Bethlehem Steel Co., South Bethlehem

LAUNDRY APPLIANCES

Keystone Mfg. Co., Albion
Apollo Step Ladder Co., Apollo
Clearfield Wooden-Ware Co., Inc., Clearfield
Coudersport Mangle Roller Mfg. Co., Couders-
port
East Greenville Mfg. Co., East Greenville
American Mfg. and Novelty Co., Erie
Lovell Mfg. Co., Erie
The Wagner Curtain Stretcher Co., Greensburg
Wyman Kimble Planing Mill, Honesdale
S. H. Everett, McEwensville
Motz Lumber Co., Monessen
Stokes Mfg. Co., Montgomery
Miller Mfg. Co., Myerstown
The Eclipse Co., North Girard
The Empire Co., North Girard

Gen. Mfg. Co., North Girard
Frank Hopkins, North Girard
L. Hopkins Mfg. Co., North Girard
Penn. Mfg. Co., North Girard
J. T. Hammond & Son, Inc., 4534 Hedge St.,
Frankford, Philadelphia
John P. Little Co., Picture Rocks
Acme Mfg. Co., Marshall Ave., N. S., Pittsburgh
Josiah Frederick, Pottstown
Household Mfg. Co., Royersford
Mayes Novelty Factory, Sonestown
Sonestown Mfg. Co., Sonestown
The Specialty Mfg. Co., Titusville
D. W. Frazee, Wellsboro
Atlas Wooden Novelty Co., Williamsport
Sonestown Manufacturing Co., Williamsport

MACHINERY AND APPARATUS, ELECTRICAL

Penna. R. R. Co. (Foundries), Altoona
Westinghouse Elec. Mfg. Co., East Pittsburgh
Chas. F. Foulkrod, 2235 Wood St., Philadelphia
Louis Kirchgraber, 613-15 Cherry St., Philadel-
phia

Standard Underground Cable Co., Westinghouse
Bldg., Pittsburgh
The Union Switch and Signal Co., Swissvale,
Pittsburgh
Hazard Manufacturing Co., Wilkes-Barre

MACHINE CONSTRUCTION

S. Flory Mfg. Co., Bangor
Keystone Driller Co., Beaver Falls
Blaisdell Machinery Co., Bradford
Boviard & Seyfang Mfg. Co., Bradford
Carbondale Mch. Co., Carbondale
The Wolf Co., Chambersburg
P. G. Frederick & Co., Chicora
Wangaman Mfg. Co., Clarendon
Clearfield Machine Shops, Clearfield
Downingtown Mfg. Co., Downingtown
The Eddystone Mfg. Co., Eddystone
Wilmot Engineering Co., Hazleton
McLanahan-Stone Machine Co., Hollidaysburg
American Road Machine Co., Kennett Square
Edwards Mfg. Co., Laceyville
Curtis E. Showalter, Landisburg
Robinson Mfg. Co., Muncy
Sprout, Waldron & Co., Muncy
New Holland Machine Co., New Holland
Weaver & Co., New Oxford

Oil Well Supply Co., Oil City
New Jersey Zinc Co., Palmerton
James Barker, Inc., Sixth and Cayuga, Phila-
delphia
Ajax Mfg. Co., 848 Jarville, N. S., Pittsburgh
Thomas Carlins Sons Co., 1600 River Ave., Pitts-
burgh
Mackintosh, Hemphill & Co., Twelfth and Etna,
Pittsburgh
Sigwart & Rolston Mch. Works, Cor. Garrison
Place and Duquesne Way, Pittsburgh
Ellis Keystone Agl. Works, Pottstown
Philadelphia & Reading R. R. Co., Reading
Landis Bros., Rheems
Mayes Novelty Factory, Sonestown
H. C. Mapes, Tionesta
Frick Co., Waynesboro
Geiser Mfg. Co., Waynesboro
A. B. Farquhar Co., Ltd., York
Hench & Drumgold, York

MANUAL TRAINING PRACTICE (SLOYD)

School, Altoona
School, Beaver Falls
School, Braddock
School, Butler
School, Conshohocken
School, Corry
School, DuBois
School, Erie
Technical High School, Harrisburg
Schwab Industrial School, Homestead
School, Johnstown

School, Lebanon
School, Monessen
School, New Castle
Carnegie Tech. School, Pittsburgh
Schools, Pittsburgh
School, Reading
Technical High School, Adams Ave., Scranton
School, Sharon
Penn. State College, State College
Radnor Township High School, Wayne
Schools, Williamsport

MINE EQUIPMENT

Alden Coal Co., Alden Station
W. Harry Brown, Allea
Latrobe Coal Co., Altoona
Fall Brook Coal Co., Antrim
Lake Ariel Lumber Co., Ariel
Pittsburg & Southwestern Coal Co., Avella
Charles M. Dodson & Co., Beaver Brook
Beaver Run Coal Co., Beaverdale
Connell Anthracite Mining Co., Bernice
Big Run Mfg. Co., Big Run
Bells Mill Coal Co., Blairsville
Blairsville Coke Co., Blairsville
Conemaugh Coal Co., Blairsville
Graft Coal Co., Blairsville
Maher Coal & Coke Co., Blairsville
Roaring Run Mining Co., Blairsville
Blossburg & Coal Run Coal Co., Blossburg
Jenkins Bros., Blossburg
Terry Coal Co., Blossburg R. D.
McClane Coal Co., Bridgeville
Brier Hill Coke Co., Bridgeville
E. J. Walker & Co., Brisbin
Schuylkill Lehigh Coal Co., Brockton
McKnight Coal Co., Brockwayville
Champion Connellsville Coke Co., Brownsville
Union Connellsville Coke Co., Brownsville

Lake Shore Gas Coal Co., Buena Vista
East Mountain Coal Co., Carbondale
Casey Coal Co., Carnegie
Cheat Haven Coal & Coke Co., Cheat Haven
Clearfield Bituminous Coal Corp., Clearfield
Clearfield Clay Working Co., Clearfield
Goshen Coal Co., Clearfield
Blain Run Coal Co., Coalport
Evans Coal & Coke Co., Connellsville
R. Manetta Coal Co., Connellsville
Manetta Connellsville Coke Co., Connellsville
Pittsburg Plate Glass Co., Creighton
E. H. Leathers, Curtin
Ford Collieries Co., Curtisville
Washington Coal & Coke Co., Dawson
George Minns, Jr., DuBois
Oak Hill Coal Co., Duncott
Carney & Brown Coal Co., Scranton, Dunmore
Rr. P. O.
Hillsdale Coal & Iron Co., Scranton, Dunmore
Rr. P. O.
Keystone Mining Co., East Brady
Monarch Coal Co., East Brady
Island Run Coal Co., East Liverpool
Springfield Coal Mining Co., Ebensburg
Ellsworth Collieries Co., Ellsworth
Crescent Coal Co., Epton

MINE EQUIPMENT—Continued

Export Coal Co., Export
Clinton Falls Coal Co., Forest City
Eagle Coal Co., Fredell
Kerr Coal Co., Freeport
H. D. Brady, Gallitzin
The Taylor & McCoy Coal & Coke Co., Gallitzin
Enterprise Coal Co., Garrett
W. R. McTurk Coal Co., Girardsville
Cornell Coal Co., Glassmere
Graceton Coke Co., Graceton
Apollo Coal Co., Greensburg
Atlantic Crushed Coke Co., Greensburg
Keystone Coal & Coke Co., Greensburg
Rich Hill Coal Co., Hastings
J. S. Wentz & Co., Hazelbrook
Harwood Coal Co., Hazleton
Hazel Mountain Coal Co., Hazleton
A. Pardee & Co., Hazleton
Estate of A. S. Van Wickle, Hazleton
Penn-Mary Coal Co., Hellwood
McLanahan-Stone Mach. Co., Hollidaysburg
Penna. Smokeless Coal Co., Hollsopple
W. S. B. Hays, Homestead
Huntingdon Coal Co., Huntingdon
John Langdon, Huntingdon
The L. C. Haslinger Co., Indiana
Broad Top Coal & Mineral Co., Jacob
G. B. Markee Co., Jeddo
Humbert Coal Co., Jessup
Cambria Steel Co., Johnstown
Suppes Coal Co., Johnstown
Great Lakes Coal Co., Kaylor
East Boston Coal Co., Kingston
Allegheny River Mining Co., Kittanning
Stewart Coal Co., Knox Dale
The Lehigh Coal & Navigation Co., Lansford
Latrobe-Connellyville Coal & Coke Co., Latrobe
Unity-Connellyville Coal Co., Latrobe
Widnoon Coal Mining Co., Lawsonham
Armstrong County Coal Co., Leechburg
Jas. Harris & Sons, Lilly
Lloydell Coal Mining Co., Lloydell
Logansport Coal Co., Logansport
Raridan & East Brady C. Co., Logansport
Northern Anthracite Coal Co., Lopez
Paritan Coal Co., McClellandtown
Bowman Bros. Co., McKeesport
Moosic Mountain Coal Co., Marshwood
Spring Hill Coal Co., Mayfield
T. H. Wachun, Mayfield
Atlantic Coal Co., Meyersdale
Phillips Bros., Middleport
Buck Run Coal Co., Minersville
Darkwater Coal Co., Minersville
Pine Hill Coal Co., Minersville
West End Coal Co., Mocanagua
Dodson Coal Co., Morea Colliery
National Mining Co., Morgan
The Leesburg Coal Co., New Castle
Thompson Connellyville Coal Co., New Salem,
R. D.
Olyphant Coal Co., Olyphant, R. D.
The Hedstrom Coal Mining Co., Parkers Landing
Mt. Jessup Coal Co., Peckville
Penfield Coal & Coke Co., Penfield
Colonial Collieries Co., Philadelphia
Forge Coal Mining Co., 1000 Franklin Bank
Bldg., Philadelphia
Highland Coal Mining Co., Real Estate Trust
Bldg., Philadelphia
Lehigh & Wilkes-Barre Coal Co., 716 Reading
Terminal, Philadelphia
W. H. Piper & Co., Real Est. Trust Bldg.,
Philadelphia
Shoemaker Coal Mining Co., 1507 Real Estate
Trust Bldg., Philadelphia
South Fork Coal Mining Co., Bullitt Bldg., 421
Chestnut St., Philadelphia
Bessemer Coal Co., Oliver Bldg., Pittsburgh
Blaine Coal Co., Fulton Bldg., Pittsburgh
Carnegie Coal Co., 1315 Paix Bldg., Pittsburgh
H. C. Frick Coke Co., Pittsburgh
John M. Greek & Co., 310 Park Bldg., Pittsburgh
Hostetter Connellyville Coal Co., Pittsburgh
Monongahela River Consolidated Coal & Coke
Co., Smithfield St., Pittsburgh
Mountain Smokeless Coal Co., 2204 Oliver Bldg.,
Pittsburgh
Oliver & Snyder Steel Co., South Tenth & Muriel
Sts., Pittsburgh
Pittsburgh-Baltimore Coal Co., First National
Bank Bldg., Pittsburgh

Pittsburgh Coal Co., Smithfield St., Pittsburgh
Pittsburgh-Westmoreland Coal Co., Fulton Bldg.,
Pittsburgh
Sampson & Hormel, Wilkesburg, R. D., Pitts-
burgh
J. H. Sanford Coal Co., 1315 Park Bldg., Pitts-
burgh
Somerset Smokeless Coal Co., First National
Bank Bldg., Pittsburgh
United Coal Co., First National Bank Bldg.,
Pittsburgh
United Connellyville Coal Co., Oliver Bldg.,
Pittsburgh
The Vesta Coal Co., Third Ave. and Ross St.,
Pittsburgh
McCauley Coal Co., Pittston
Yost Mining Co., Pittston
Roaring Run Mining Co., Plainsville
Parrish Coal Co., Plymouth
The Penker Coal Co., Portage, R. D.
Philadelphia & Reading Coal & Iron Co., Potts-
ville
Anita Coal Mining Co., Punxsutawney
Bowersville Coal Co., Punxsutawney
Cortez Coal Co., Punxsutawney
John McLeavy & Co., Punxsutawney
Geo. Pearce & Sons, Puritan
Bulah Coal Co., Ramey
Bulah Shaft Coal Co., Ramey
Girard Mammoth Coal Co., Ravenrun
Jermyn & Co., Rendham
Ironton Coal & Coke Co., Rosebud
Butcher Creek Coal Co., St. Clair
Mount Hope Coal Co., St. Clair
The St. Clair Coal Co., St. Clair
Shawmut Mining Co., St. Marys
Bowman Coal Mining Co., Saltsburg
M. S. Kemmerer & Co., Sandy Run
Lincoln Coal & Coke Co., Scottdale
Carney & Brown Coal Co., Dunmore, Scranton
The Delaware, Lackawanna & Western R. R.
Co., Mining Dept., Scranton
Dolph Coal Co., Ltd., Scranton
Hillsdale Coal & Iron Co., Dunmore, Scranton
Nay Aug Coal Co., Scranton
Pennsylvania Coal Co., Dunmore, Scranton
Peoples Coal Co., Scranton
Scranton Coal Co., Scranton
Oxford Coal Co., Shaft
H. H. Smith & Co., Shaft
Greenough Red Ash Coal Co., Shamokin
Shipman Coal Co., Shamokin
Thomas Colliery Co., Shenandoah
J. B. Anderson & Son, Shickshinny
Baxter Ridge Coal Co., Smithfield
Leland Coal Mining Co., Smokerun
Consolidation Coal Co., Somerset
H. C. Stineman, South Fork
O. M. Stineman, South Fork
H. A. Underwood, Strattonville
East Deer Coal Co., Tarentum
D. L. Ruff, Tarrs
Price Pancoast Coal Co., Throop
Brownsville Coal Co., Uniontown
Hope Coal Co., Uniontown
Hinstead-Semans Coal & Coke Co., Uniontown
Olive Coal Co., Uniontown
W. J. Parshall, Uniontown
Prospect Coal & Coke Co., Uniontown
South Fayette Coal Co., Uniontown
Waltersburg Coal Co., Uniontown
Whyel Coal Co., Uniontown
Vinton Colliery Co., Vintondale
Genuine Connellyville Coal Co., Waltersburg
Lackawanna Coal & Coke Co., Wehrum
A. J. Lundquist & Co., Wellshoro R. D.
H. W. White, Whites Valley
Midvalley Coal Co., Wilburton
Coke Bros. & Co., Inc., Wilkes-Barre
Lehigh Valley Coal Co., Wilkes-Barre
Susquehanna Coal Co., Wilkes-Barre
Sampson & Hormel, Pittsburgh, Wilkesburg
R. P. O.
Berwind-White Coal Mining Co., Windber
W. J. Stein, Woodville
*Jefferson & Clearfield Coal & Iron Co., Ro-
chester, N. Y.
*Rochester & Pittsburgh Coal & Iron Co., Roch-
ester, N. Y.
*Warner-Leonard Coal Co., Cleveland, Ohio
*Atlas Coke Co., Works at Helen, Pa.; Leetonia,
Ohio

*These companies have collieries in Pennsylvania.

PATTERNS AND FLASKS

International Motor Co., Allentown
Penn. R. R. Co. (Foundries), Altoona
Penn. R. R. Co. (Juniata Shops), Altoona
The Autocar Co., Ardmore
S. Flory Mfg. Co., Bangor
Keystone Driller Co., Beaver Falls
Hertzer & Zook Co., Belleville
Gruber Wagon Works, Bernville
Blairsville Enamelware Co., Blairsville
Herman & Hassert, Inc., Bloomsburg
Improved Traction Engine Co., Boynton
West Penn. Steel Co., Brackenridge
Braddock Machine & Mfg. Co., Braddock
Blaisdell Machinery Co., Braddock
Bovard & Seyfang Mfg. Co., Bradford
Standard Cast Iron Pipe & Foundry Co., Bristol
Logan Iron & Steel Co., Burnham
Standard Steel Works Co., Burnham
California Foundry & Machine Co., California
American Welding Co., Carbondale
The Carbondale Mch. Co., Carbondale
Chambersburg Engineering Co., Chambersburg
The Wolf Co., Chambersburg
Cherry Tree Iron Works, Cherry Tree
American Steel Foundries, Chester
Federal Steel Foundry Co., Chester
Penn. Steel Casting & Machine Co., Chester
Clearfield Fire Brick Co., Clearfield
Clearfield Machine Shops, Clearfield
Harbison Walker Ref. Co., Clearfield
Luckens Iron & Steel Co., Coatesville
Freed Heater Co., Inc., Collegeville
The Keeley Store Co., Columbia
Cornopolis Mfg. Co., Coraopolis
Shamburg & Allen Mach. Co., Coraopolis
Downingtown Mfg. Co., Downingtown
Westinghouse Electric Mfg. Co., East Pittsburgh
Pennsylvania Iron Works Co., Eddystone
The Eddystone Mfg. Co., Eddystone
A. Buch's Sons Co., Elizabethtown
L. L. Fisk, Emporium
General Electric Co., Erie
National Foundry Co., Erie
Frank R. Glisson, Exton
Fleetwood Metal Body Co., Fleetwood
American Steel Foundries, Franklin
Wm. Shimer, Son & Co., Freemansburg
Buffalo & Susquehanna R. R., Galeton
Pittsburgh Steel Foundry, Glassport
The Kelley & Jones Co., Greensburg
The W. O. Hickok Mfg. Co., Harrisburg
Wilmot Engineering Co., Hazleton
McLanahan-Stone Mach. Co., Hollidaysburg
Hyde Park Foundry & Machine Co., Hyde Park
Pa. Rubber Co., Jeannette
F. & E. Trump, Jersey Shore
Cambria Steel Co., Johnstown
The Lorain Steel Co., Johnstown
American Road Machine Co., Kennett Square
Orenstein-Arthur Koppel Co., Koppel
Crucible Steel Casting Co., Lansdowne
Sanitary Co. of America, Linfield
Rosenfranz Machine Co., McKeesport
Taylor-Wilson Mfg. Co., McKees Rocks
Johnetta Fdy. & Machine Co., Marianna
Robinson Mfg. Co., Muncy
Sprout, Waldron & Co., Muncy
Union Spring & Mfg. Co., New Kingston
The Alan Wood, Iron & Steel Co., Norristown
Norris Pattern and Machine Co., Norristown
National Transit Co. Shops, Oil City
Oil Well Supply Co., Oil City
Osceola Silica & Fire Brick Co., Osceola Mills
S. B. Stine, Osceola Mills
New Jersey Zinc Co., Palmerton
American Bridge Co. and Pencoyd Iron Works,
Pencoyd
Geo. R. Allen, 13th & Buttonwood, Philadelphia
American Pattern Works, 3336 Market St., Phila-
delphia
Edwin A. Anderson, 203 Quarry St., Philadelphia
The Baldwin Locomotive Works, 500 N. Broad
St., Philadelphia
James Barker, Inc., Sixth & Cayuga, Philadel-
phia
Charles P. Biggin Co., 1829 Harlan St., Phila-
delphia
E. Bromily & Son, Orthodox & Gaul, Philadel-
phia
Edw. L. Calley, 945 Ridge Ave., Philadelphia
Clarks Iron Foundry, 35th & Grays Ferry Road
Frank P. Cooper, 130 Reed St., Philadelphia
Oliver I. Dill, 406 N. Tenth St., Philadelphia
The Eynon Evans Mfg. Co., 15th & Clearfield,
Philadelphia

Fairmount Patterns Works, 1922 Brandywine
St., Philadelphia
Richard Fields, 814 Buttonwood, Philadelphia
R. G. Fleischmann, 407 Cherry St., Philadelphia
Girard Iron Works, 22d & Master Sts., Phila-
delphia
John Grass Wood Turning Co., 222 Vine St.,
Philadelphia
George G. Gumpert, 240 Cherry St., Phila.
Hale & Kilburn Co., 18th & Lehigh Ave.,
Philadelphia
William L. Halsam, 506 N. 12th St., Philadelphia
Edw. Harrington, Son & Co., 17th and Callow-
hill, Philadelphia
William C. Hornel, 1407 Vine St., Philadelphia
Humphreys Chr. Stman Co., 635 N. Watt St.,
Philadelphia
Thomas J. Hunter Co., 148 N. 7th St., Phila-
delphia
Walter S. Kalbach, 2227 Wood St., Philadelphia
T. B. Luzier & Son, 1645 N. 10th St., Philadel-
phia
John McConville, 215 N. 2d St., Philadelphia
H. A. May Foundry Co., 30th & Chestnut Sts.,
Philadelphia
Meerbach & Schneider, 1612 Vandyke St., Phila-
delphia
Thos. Mills & Bro., Inc., 1301 N. 8th St., Phila-
delphia
Frank Pettit Ornamental Iron Works, 809 Mas-
ter St., Philadelphia
Quaker City Pattern Works, 504 N. 12th St.,
Philadelphia
Isaac A. Sheppard & Co., Erie Ave. & Sepviva,
Philadelphia
J. Thompson & Co., Van Horn & Sophia Sts.,
Philadelphia
Tioga Foundry Co., 22d & Allegheny, Philadel-
phia
Union Machine Works & Iron Fdy., 1821 S.
Water St., Philadelphia
V. W. Mfg. Co., 1616 North St., Philadelphia
W. J. Webb, 821 Cherry St., Philadelphia
Wm. Wharton, Jr. & Co., Inc., 25th & Wash-
ington Ave., Philadelphia
Wicks Bros., Philadelphia
Phoenix Iron Co., Philadelphia
Phoenix Machine Co., Phoenixville
American Steel Foundries, 36th & A. V. Ry.,
Pittsburgh
Axthelm Mfg. Co., 242 Third Ave., Pittsburgh
Best Mfg. Co., Pittsburgh
Thomas Carlin's Sons Co., 1600 River Ave., Pitts-
burgh
Duquesne Steel Foundry Co., 1104 Arrott Bldg.,
Pittsburgh
Epping-Carpenter Co., 41st & A. V. Ry., Pitts-
burgh
Fort Pitt Mal. Iron Co., Box No. 1054, Pitts-
burgh
Iron City Sanitary Mfg. Co., 1514 Oliver Bldg.,
Pittsburgh
Lewis Foundry & Machine Co., Box. No. 1597,
Pittsburgh
McConway & Tooley Co., 48th & A. V. Ry.,
Pittsburgh
McDowell & Co., Galveston & Western, N. S.,
Pittsburgh
Mackintosh, Hemphill & Co., 12th & Etna Sts.,
Pittsburgh
The Marine Mfg. & Supply Co., Water St.,
Pittsburgh
The Phoenix Glass Co., Box 757, Pittsburgh
Pittsburgh Elec. & Mch. Wks., Barker Place,
Pittsburgh
Pittsburgh Malleable Iron Co., Pittsburgh
H. K. Porter Co., 49th & A. V. Ry., Pittsburgh
G. & J. Rieseck, 16th St., Pittsburgh
Sigwart & Rolston Mch. Works, Cor. Garrison
Place & Duquesne Way, Pittsburgh
The Simonds Mfg. Co., 25 Liberty Sts., Pitts-
burgh
Slentz Mfg. Co., 326 3rd Ave., Pittsburgh
Sommerfeld Mach. & Mfg. Co., 216 2d Ave.,
Pittsburgh
Standard Pattern Co., 28th St., Pittsburgh
Union Fdy. & Machine Co., Pittsburgh
Union Switch & Signal Co., Braddock Ave.,
Swissvale, Pittsburgh
H. R. Walter Lbr. Co., Fayette & Manhattan
Aves., Pittsburgh
Punxsutawney Fdry. & Machine Co., Punxsu-
tawney
Roberts, Winner & Co., Quakertown

PATTERNS AND FLASKS—Continued

Philadelphia & Reading Ry. Co., Reading
The S. G. V. Co., Reading
John G. Speidel, Reading
Buckwalter Stove Co., Royersford
Grander Stove Co., Royersford
S. G. Barker & Son, Scranton
Delaware, Lackawanna & Western R. R. Co., Scranton
The National Malleable Castings Co., Sharon
Sharon Foundry Co., Sharon
Bethlehem Steel Co., South Bethlehem
Keystone Stove Fdy., Spring City
The Pennsylvania Steel Company, Steelton
Union Switch & Signal Co., Pittsburgh, Swissvale Br. P. O.
Messinger Mfg. Co., Tatamy
The Westinghouse Machine Co., Trafford

Verona Steel Castings Co., Verona
Frick Co., Waynesboro
Geiser Mfg. Co., Waynesboro
Landis Machine Co., Waynesboro
Landis Tool Co., Waynesboro
General Refractories Co., West Decatur
Lehigh Valley Coal Co. & Coxe Bros. & Co., Inc., Wilkes-Barre
Vulcan Iron Works, Wilkes-Barre
Shumons Wood Working Co., Williamsport
Westinghouse Air Brake Co., Wilmerding
Harbison-Walker Ref. Co., Woodland
A. B. Farquhar Co., Ltd., York
Hench & Drungold, York
Pullman Motor Car Co., York

PIPES, TOBACCO

William Kaffer, 1123 N. Orianna, Philadelphia
L. Nax, 146 Noble, Philadelphia

Shaw & Leopold, Randolph & Montgomery, Philadelphia

PLANING MILL PRODUCTS

(Including Sash, Doors and Blinds, and General Millwork)

W. M. Stover, Aaronsburg
A. A. Albright & Son, Allentown
Butz-Frederick & Co., Allentown
Altoona Concrete Construction & Supply Co., Altoona
Altoona Construction Co., Altoona
H. S. & C. S. Barthey, Altoona
D. Counsman & Son, Altoona
R. D. Elder Lumber Co., Juniata (Br. P. O.), Altoona
J. B. Fluke & Son, Altoona
J. C. Ivory, Altoona
Penn. Railroad Car Shops, Altoona
Penn. Railroad Juniata Shops, Altoona
H. S. Nunemaker, Alum Bank
Ohio Valley Lumber Co., Ambridge and Economy
East Penn. Lumber Co., Inc., Anasomink
D. L. Saylor & Sons, Annville
W. W. Wallace & Co., Apollo
Adam Waldner, Ashland
Babcock Lumber Co., Ashtola
J. J. Weber, Ashville
Comeby & Harris, Athens
C. F. Thayer, Atlantic
H. J. Hawthorn, Bainbridge
Samuel F. Friedline, Bakersville
John Stauffer, Bailly
Bangor Lumber Manufacturing Co., Bangor
Wise Lumber & Coal Co., Bangor
Barnesboro Lumber Co., Barnesboro
T. F. Polley, Bear Lake
Anderson & Cook, Beaver
Beaver Falls Planing Mill Co., Beaver Falls
Commercial Sash & Door Co., Beaver Falls
J. S. Mitchell & Sons, Beaver Falls
Rhodes & Garvin, Beaver Falls
Reed & Spald, Beavertown
Arnold Planing Mill, Bedford
Bedford Planing Mill Co., Bedford
Bellefonte Lumber Co., Bellefonte
P. B. Crider & Son, Bellefonte
T. R. Hamilton, Bellefonte
Belle Vernon Planing Mill Co., Belle Vernon
Joseph M. Young & Co., Belleville
Jonas Renfer, Benfer
R. T. Smith & Son, Benton
Berwick Lumber & Supply Co., Berwick
Harry Fahringer, Berwick
Berwyn Millwork & Lumber Co., Berwyn
E. L. Jawver, Biglerville
Andre Lumber Co., Blairsville
Columbia Plate Glass Co., Blairsville
A. R. Hartman, Bloomsburg
Richter Bros., Blossburg
H. A. Cline, Bollivar
S. W. McLean, Bollivar
Enreka Lumber Co., Roswell
Maust Lumber Co., Headquarters, Elk Lick, Roynton
Braddock Lumber Co., Braddock
McBride Bros., Braddock
Price & Alman, Braddock
H. C. Remis, Bradford
Tuna Manufacturing Co., Bradford

W. H. Mellatt, Breezewood
I. F. March's Sons, Bridgeport
Anderson Lumber Co., Brookville
J. C. Lucas, Brookville
Vanleer Bros., Brookville
Brownsville Construction Co., Brownsville
Irwin Arnold, Buffalo Mills
J. H. Patchin, Burnside
Butler Planing Mill Co., Butler
Cornelius Lumber Co., California
John R. Powell's Sons, Cambridge Springs
C. W. Blystone & Son, Cambridge Springs
Phoenix Novelty Co., Cambridge Springs
G. M. Coon, Canton
H. Crawford & Sons, Canton
The Holt Lumber Co., Carbondale
J. A. Hoole, Carbondale
Robert F. Nemire, Carbondale
N. B. Robinson, Carbondale
The Beetem Lumber & Manufacturing Co., Carlisle
Carnegie Mill & Lumber Co., Carnegie
H. J. & W. A. Krumenacker, Carrolltown, R. D.
G. M. Green, Cassville
Franklin Goldsmith & Son, Catasauqua
Zettie Bros., Center Hall
A. C. Kelly, Center Moreland
G. S. Cole, Center Road Station
C. P. Blackburn, Cessna, R. D.
Blair & Raifinder, Chambersburg
J. A. Hollinger, Chambersburg
Geo. A. Minnick & Son, Chambersburg
H. O. Swartzwelder, Chaneyville
Charleroi Lumber Co., Charleroi
Walton Lumber Co., Inc., Charleroi
J. A. Phillips & Co., Cheltenham
Stracey G. Glauser & Son, Chester
James M. Hamilton, Chester
B. W. Kinports, Cherry Tree
E. Somerville, Cherry Tree
P. G. Frederick Co., Chicora
Davis Lumber & Planing Mill, Christiansa
Waugaman Manufacturing Co., Clarendon
J. C. McElhattan, Clarion
Summit Lumber Co., Clarks Summit
F. J. Egan, Claysville
Clearfield Millwork & Lumber Co., Clearfield
Gearhart & Wrigley, Clearfield
Samuel State, Cloe
S. Hagarty's Sons, Coalport
J. W. Meyer, Coburn
Andrew Vonada, Coburn
Shafer Bros. & Nelson, Cochran
J. Jay Wisler, Columbia
E. E. Peckham, Columbia Cross Roads
Confluence Lumber Co., Confluence
R. H. DeArment, Conneaut Lake
V. H. Dennis, Conneaut Lake
Moss Bros., Conneaut Lake
Connellsville Planing Mill Co., Connellsville
Fayette Lumber Co., Connellsville
Keystone Planing Co., Connellsville
South Connellsville Lumber Co., Connellsville
Wm. Potts Jones, Conshohocken
The A. L. Miller Co., Conshohocken
Isaac D. Shaffer, West Conshohocken Conshohocken

PLANING MILL PRODUCTS—Continued

The A. L. Miller Co., Conshohocken
Wm. Shilling, Cool Spring
McKown & Beattie, Coraopolis
H. A. Button, Coudersport
James S. Swinley, Cowanesque
Ingram Lumber & Supply Co., Pittsburgh, Crafton (Br. P. O.)
Ed O'Brien, Cresson
George C. Abraham, Damascus
Danville Lumber Co. (Mill at Milanville), Danville
Collingdale Millwork Co., Darby
Stubbs & Culp, Delta
Denver Planing Mill, Denver
Allen Lumber Co., Donora
H. E. Quickel, Dover
Frank J. Gerlitzki, Doylestown
F. L. Worthington, Doylestown
J. C. Doyle, Dry Run
A. D. Orner Woodworking Co., Dubois
G. W. Piper Sons, Dubois
George Smyers, Dubois
George H. Bingham, Scranton, Dunmore (Br. P. O.)
Ziegler Lumber Co., Duquesne
Graham Lumber Co., East Brady
Fitzgerald-Speer Co., Easton
J. Monroe Young, Easton
Rutter Bros., 225 Monroe Ave., Turtle Creek, East Pittsburgh
East Stroudsburg Lumber Co., Inc., East Stroudsburg
S. M. Milliken, East Waterford
Ebensburg Planing Mill Co., Ebensburg
Robert J. Wade, Edinboro
Elizabeth Planing Mill Co., Elizabeth
H. H. Brant, Elizabethtown
I. T. Buffington, Elizabethtown
National Supply & Construction Co., Ellwood City
Ulrich Sloan's Planing Mill, Emlenton
L. L. Fisk, Emporium
B. T. Gealy, Enon Valley
Ephrata Planing Mill Co., Ephrata
George Carroll & Bro. Co., Erie
The Constable Bros. Co., Erie
A. A. Deming, Erie
Lyman Felheim, Erie
James D. Johnson & Co., Erie
Kirchner Bros., Erie
D. S. Milloy, Erie
D. Schlosser Co., Erie
Henry Shenk Co., Erie
Collins Bros., Epsbyville
The Edward Dambach Co., Evans City
Earlston Planing Mill Co., Everett
Everett Planing Mill Co., Inc., Everett
Export Lumber Co., Export
McCormick Lumber Co., Fairchance
B. F. Beers, Fallentimber
Falls Creek Planing Mill Co., Falls Creek
Fawn Grove Lumber Co., Fawn Grove
James Patterson, Fayette City
Finleyville Planing Mill Co., Finleyville
A. T. Mullin, Lincoln Falls, Forksville R. D.
Joe S. Rotz, Fort London
Haupt Bros. & Co., Frackville
American Steel Foundries, Franklin
The James Lumber Co., Franklin
Marsteller Bros. Lumber Co., Fredonia
W. T. Mohler, Freedom
Freeport Planing Mills Co., Freeport
A. King & Sons, Freeport
Friedens Planing Mill Co., Friedens
M. Schultz, Gallitzin
Albert Adsit, Geneva
W. L. Adsit, Geneva
George W. Stolsmith, Gettysburg
Glassport Lumber Co., Glassport
Glen Manufacturing Co., Glen Rock
Glen White Coal & Lumber Co., Glenwhite
W. G. Doughman, Grampian
Greencastle Elevator Co., Greencastle
J. C. Reed, Greensburg
South Greensburg Lumber Co., Greensburg
Struble & Walther, Greensburg
Chas. C. Baker, Greenville
Hollman Lumber Co., Greenville
King Planing Mill & Supply Co., Grove City
McKay Gilmore Furniture Co., Grove City
L. B. Walbert, Hancock
John F. Rohrbaugh & Co., Hanover
Union Planing Mill Co., Inc., Harrisburg
E. B. Koons, Harveyville
Stuttmaster Bros., Hastings
Atkinson Box & Lumber Co., Hawley

H. F. Bright Lumber Co., Hazleton
Hazleton Manufacturing Co., Hazleton
Kellmer Piano Co., Hazleton
Pennsylvania-Maryland Coal Co., Hellwood
Herdon Manufacturing Co., Herndon
James B. Condron, Hollidaysburg
M. S. Hunter & Sons, Hollidaysburg
Noah Ott, Hollisopple
M. H. Kisinger, Homer City
Feath & Kerr, Homestead
George M. Hall & Co., Homestead
Homestead Lumber Co., Homestead
Pennard Manufacturing Co., Honesdale
H. G. Hamer, Hooversville
Chas. E. Pletcher, Howard
M. Gills, Hughesville
Huntingdon Millwork & Lumber Co., Huntingdon
W. J. O'Mara, Huntingdon
W. F. Laidig, Hustontown
Benjamin Gilson, Hydetown
James M. Ahlbum, Hyndman
H. Legas & Rush, Hyndman
W. S. Daugherty, Indiana
Indiana Lumber & Supply Co., Indiana
W. K. Sparks, Indian Head
Irwin Lumber Co., Irwin
M. J. Snodgrass, Jamestown
T. H. Hazlett Lumber Co., Jeannette
Union Planing Mill & Lumber Co., Jeannette
W. C. Nicholson & Co., Jermyn
Camerer & Lambert, Jersey Shore
Cambria Steel Co., Johnstown
Conemaugh Lumber Co., Johnstown
Johnstown Millwork & Lumber Co., Johnstown
Johnstown Planing Mill Co., Johnstown
The Thomas Kinzey Lumber Co., Johnstown
The Lorain Steel Co., Johnstown
David Ott & Co., Johnstown
Wm. H. Smith Bros., Johnstown
Levi M. Thomas, Thomas Mill, Johnstown P. O.
Kane Blind & Screen Co., Kane
Peterson & Skooglund, Kane
Emporium Lumber Co., Keating Summit
C. G. Gawthrop Co., Kennett Square
J. F. Seward & Co., Wilkes-Barre, Kingston (Br. P. O.)
John R. Senger & Sons, Kinzers
P. S. Patterson, Kirby R. D.
American Planing Mill Co., Kittanning
Heilman Bros. Lumber Co., Kittanning
Henry Shaffer Lumber Co., Kittanning
West Kittanning Lumber Co., Kittanning
W. W. Bowman, Knox
I. M. Edgecomb's Sons, Knoxville
H. F. Kreamer, Kreamer
Heffner & Savage, Kutztown
J. H. Kirk & Co., Kylertown
A. L. Vandervort, Laceyville
Whipple Bros., Laceyville
John F. Johnson, Laidig
Herr, Draper & Co., Lancaster
Keystone Planing Mill Co., Lancaster
The Wohlson Planing Mill Co., Lancaster
Jacob W. Drescher, Lansdale
Wm. C. Shuster, Jr., Landsdowne
George C. Anderson & Sons, Inc., Latrobe
Miller Bros., Inc., Lebanon
Leechburg Lumber Co., Leechburg
Leighton Lumber Co., Leighton
E. K. Frazer, Lemoyne
H. M. Stauffer, Leola
Le Raysville Furniture & Toy Mfg. Co., Le Raysville
Kulp Planing Mill Co., Lewistown
R. N. Miller, Liberty
Tohr Bros., Ligonier
International Silo Co., Linesville
Keath-Shields Planing Mill Co., Lititz
Neidmyer Bros., Lititz
C. E. Bucher, Littlestown
George R. Julius & Bro., Littlestown
K. D. Batchelder, Lock Haven
Clinton Furniture Co., Lock Haven
Hipple Estate, Lock Haven
H. W. Ruggles, Wilkes-Barre, Luzerne (Br. P. O.)
Frank L. Underwood, Luzerne
N. F. Shillingford, McAllisterville
P. F. Black, McConnellsburg
Wm. S. Clevenger, McConnellsburg
Spangler & Harris, McConnellsburg
Downie & McCord, McKeesport
John Calvert, McKees Rocks
John Davis & Co., McKees Rocks
Elmer Nesbitt, McLane

PLANING MILL PRODUCTS—Continued

Nathan Shelly, Manheim
Lumauer Bros., Manheim
E. L. Grabbie, Manor
S. M. Blakeslee, Manorville
George Zacherl, Marble
B. F. Heistand & Sons, Marietta
M. A. Snyder, Markleton
The Mars Land & Lumber Co., Mars
Bolger Graffius & Co., Martinsburg
Chas. Neast & Co., Mauch Chunk
George H. Cutter Lumber Co., Meadville
The Walter G. Harper Lumber Co., Meadville
Miner & Devore, Meadville
Mill Run Lumber Co., Meadville
W. E. Morrison & Son, Meadville
L. F. Smith, Meadville
George W. Sauter, Menges Mills
D. W. Faust & Sons, Mercersburg
O. H. Allen, Meshoppen
J. M. Stillwell, Meshoppen
Meyersdale Planing Mill, Meyersdale
Kern & Triss, Middleburg
Aaron Stetler's Estate, Middleburg
John E. Brindle, Mifflin
Enoch Miller, Mifflinburg
Elmer C. Rudy, Mifflinburg
Rowe Bros., Milford
A. Douden Planing Mill Co., Millersburg
Millersburg Manufacturing Co., Millersburg
J. F. Kerr, Marsh Run, Millerstown P. O.
Ruhl & Watson, Millmont
C. A. Swetland, Mills
Bennett Lbr. & Mfg. Co., Pittsburgh, Millvale
(Br. P. O.)
L. W. Waterhouse, Mill Village
Edward Buck, Millville
Orville Robbins, Millville
D. Clinger & Sons, Milton
Jacob Fetter's Sons, Milton
Anthracite Lumber Co., Minersville
Motz Lumber Co., Monessen
Westmoreland Lumber Co., Monessen
Monongahela Saw & Planing Mill Co., Monongahela
Yohs Bros., Monongahela
Penn Furniture Co., Montgomery
William T. Lundy, Montoursville
W. H. Lundy, Montoursville
Spring Brook Lumber Co., Moosic
L. W. Hart, Morris
P. H. Hart, Nauvoo, Morris P. O.
T. B. Stockham & Bro., Morrisville
C. P. Van Brunt Manufacturing Co., Moscow
Gelger Gibson & Co., Mount Carmel
Mount Carmel Lumber Co., Mount Carmel
Lemley Bros., Mount Morris
H. J. Helser (Mill at Shadle), Mount Pleasant Mills
A. S. Welsh, Mount Union
Edward F. Ives, Muncy
Isaac B. Haak, Myerstown
S. B. Price & Co., Nanticoke
Susquehanna Lumber Co., Nanticoke
Nazareth Planing Mill Co., Nazareth
C. O. Solomon, New Berlin
R. B. McDaniel Co., New Brighton
Maltsoff Bros. Co., New Brighton
D. H. Fair, New Buena Vista
Kline Lumber & Construction Co., New Castle
Mahoning Valley Lumber Co., New Castle
New Castle Lumber & Construction Co., New Castle
Shenango Lumber Co., New Castle
Wallace Bros., Mahoningtown Sta., New Castle
Thomas Kirscher, New Florence
W. E. Jones, New Park
Newport Planing Mill, Newport
A. W. & W. M. Watson Co., Newtown
George & Clyde Pratt, Nicholson
Rought-Wright Co., Nicholson and Factoryville
H. J. & Wm. Krunenacker, Nicktown
W. A. Butler, Nisbet R. D.
Grater Body Co., Norristown
Stow Lumber & Coal Co., North East
O. M. Webber Co., Inc., North Wales
Lillo Bros. Co., Oakdale
C. F. Reed & Bro., Oakmont
J. W. Bailey, Ohlerville
Horland & Diamond Lumber Co., Oil City
Caldwell Lumber Co., Oil City
United Lumber & Coal Co., Oil City
Wilson & Carothers, Orbisonia
L. F. Mickle, Orrtanna
Osceola Lumber Co., Osceola Mills
R. J. Walker, Osceola Mills
Wm. Adams, Osterburg

Harry Hilaman, Oxford
W. G. Sigler, Paintersville
New Jersey Zinc Co. (of Pennsylvania), Pal
merton
Early & Wengel, Palmyra
Palmyra Woodwork Manufacturing Co., Palmyra
Wm. Potts & Son, Parkersburg
A. P. Reid, Parkersburg
J. W. Logan & Sons, Parnassus
Twist & Hippensteel, Wilkes-Barre, Parsons
(Br. P. O.)
Fitzgerald-Speer Co., Pen Argyl
Harry Shaffer, Penn Run
Pennsburg Manufacturing Co., Pennsburg
J. E. Myers, Penns Station
C. P. Fox, Perkaskie
S. K. Slonecke, Perkiomenville
Daniel Adams, 2940 North Marshall St., Phila-
delphia
Ellwood Allen Lumber Co., Trenton Avenue &
Ann St., Philadelphia
Isaac Ambrose, 1118 Siebel, Philadelphia
Chas. A. Anderson, 1629 North 10th St., Phila-
delphia
Bailey & Co., 210 New St., Philadelphia
John Barber, 226 Chancellor St., Philadelphia
Gustave Berger, 1143 N. Front Street, Philadel-
phia
John M. Cromwell, 1136 Harrison Street, Phila-
delphia
D. R. Crumrine, 301 Edgewood, Philadelphia
E. M. Culbertson & Son, 2328 N. Sydenham St.,
Philadelphia
John A. Dubs, 269 S. Fifth St., Philadelphia
Eisenwein & Boorse, 1019 W. Susquehanna Ave.,
Philadelphia
Chas. Feline & Co., York Road and Butler,
Philadelphia
Fite & Arbelo Co., 20th and Glenwood,
Philadelphia
Fritz & La Rue, 1124 Chestnut St., Philadelphia
Frederick Gerry & Co., Schuylkill Ave. and Peltz
Street, Philadelphia
Wm. E. Gibson, 3527 Market St., Philadelphia
T. H. Grigg, Lancaster Ave. and Baring St.,
Philadelphia
Hale & Kilbourn Co., 18th Street and Lehigh
Ave., Philadelphia
Hull Bros. & Wood, 34th and Lancaster Ave.,
Philadelphia
Edward F. Henson & Co., 921 N. Delaware
Philadelphia
Hoeling Bros., 314 S. Lawrence, Philadelphia
Ernest Hoffman (Est), 1124-32 Washington Ave.,
Philadelphia
Solomon Horn, 615 Pine Street, Philadelphia
Chas. D. Hughes, 3072 Jauney St., Philadelphia
Joseph W. Janney, 1147 Beach St., Philadelphia
Jones, Doll & Co., 203 North 22d Street, Phila-
delphia
S. S. Keely & Sons, Main and Umbria Streets,
Philadelphia
Kensington Planing Mill, 1925 E. York Street,
Philadelphia
Louis Kirchgraber, 613-15 Cherry St., Phila-
delphia
Charles B. Kline, 28 South 16th Str., Philadel-
phia
George W. Kugler & Sons Co., 919 New Market
Street, Philadelphia
Dudley W. Lance, 721 W. Tioga St., Phila-
delphia
Richard Lloyd, 105 North 22d St., Philadelphia
T. B. Luzier & Son, 1645 North 10th Street,
Philadelphia
Joseph Miles, River Road, Manayunk Station,
Philadelphia
A. F. Miller, 239 S. Hutchinson, Philadelphia
Peter C. Osada & Co., 1422 S. Front Street,
Philadelphia
John Parker & Son, 16th and Fitzwater Streets,
Philadelphia
Pennsylvania Sash and Door Co., 25th and Col-
lowhill Streets, Philadelphia
Philadelphia Screen Manufacturing Co., 56th
Street and Woodland Avenue, Philadelphia
Stacey Hovees & Sons, 1611 Filbert Street,
Philadelphia
A. W. Remlinger, 2309 North 6th St., Philadel-
phia
William Russel Woodworking Co., 3015-29 Chest-
nut Street, Philadelphia
Seymour Bros., 3402 Lee Street, Philadelphia
Sheip & Vandergrift, Inc., 814-832 W. Lawrence
Street, Philadelphia

PLANING MILL PRODUCTS—Continued

Silberman & Fleisher, 1218 Mascher Street,
Philadelphia
Smedley Bros. Co., Church and Tacony Streets,
Frankford Sta., Philadelphia
George W. Smith & Co., Inc., 3907 Powelton
Ave., Philadelphia
Frank C. Snedaker & Co., 9th and Tioga Sts.,
Philadelphia
Robert Tarle & Son, 413-17 S. Fifth Street, Phila-
delphia
Tucker & Staehle, 167 East Allen St., Phila-
delphia
William I. Underwood & Co., Cottman and Key-
stone Sts., Tacony Sta., Philadelphia
Martin H. Walrath, Broad and Cambria Sts.,
Philadelphia
Joseph T. Ward, 5809-19 Baynton Street, Phila-
delphia
Watson & Robinson, 49 Queen Street, German-
town Sta., Philadelphia
A. Wilt & Sons, 721 N. Front St., Philadelphia
Fred V. Yeager, 9-13 S. 36th St., Philadelphia
D. Grebe & Son, Phillipsburg
Phillipsburg Planing Mill Co., Phillipsburg
Phoenix Machine Co., Phoenixville
George C. Fry & Son, Picture Rocks
Chas. Werner, Pine Grove
Leshner Lumber & Supply Co., Pitsalrn
Ahlers Lumber Co., 928 E. Ohio St., N. S.,
Pittsburgh
Ben Avon Lumber Co., Spruce Street & Brighton
Road, N. S., Pittsburgh
Robert J. Barnes Co., S 18th & Mary Streets,
Pittsburgh
Andrew Bensen, 150 South 18th St., Pittsburgh
Smith Bovard, 6616 Kelly St., Pittsburgh
Bruckman Lumber Co., Pittsburgh
Edward A. Caler, 621 Industry St., Pittsburgh
Diebold Lumber & Manufacturing Co., 99 Wa-
bash Street, Pittsburgh
b. M. Diebold Lumber Co., E. Liberty Station,
Pittsburgh

Pittsburgh Branch Post Offices.

Ingram Lbr. & Supply Co., 3 Prospect Ave.,
Ingram, Crafton, Pittsburgh
Bennett Lbr. & Mfg. Co., 213 Sedgewick St.,
Millvale, Pittsburgh
Colonial Floor Co., 1340-44, Sharpsburg, Pitts-
burg
Daniel Whitmore & Co., Hiel Ave., Wilkins-
burg, Pittsburgh
Wilkinsburg Stair & Mfg. Co., Penn Ave. &
Penn. R. R., Wilkinsburg, Pittsburgh
W. F. Youngk Co., 903 Hay St., Wilkinsburg,
Pittsburgh
The Exeter Lumber Co., Inc., Pittston
J. E. Patterson & Co., Pittston
Wyoming Valley Lumber Co., Pittston
J. W. Cook & Sons, Plateau
Clark Bros. & Co., Plymouth
John A. Clarke, Point Marion
A. K. Jenkins & Co., Point Marion
Point Marion Lumber Co., Point Marion
Leroy Pearson, Portland
H. G. Miller, Potter Brook
E. S. Potter, Potter Brook
L. M. Moll, Potts Grove
Josiah Frederick, Pottstown
William Buechley & Son, Pottsville
Kreig Bros., Pottsville
The Sailor Planing Mill & Lumber Co., Potts-
ville
Walter Wertley Cons, Pottsville
James K. Long & Son, Lindsey Station, Punxsu-
tawney
McKean, Hare & Son, Punxsutawney
Peoples Planing Mill, Punxsutawney
Punxsutawney Planing Mill Co., Punxsutawney
Silas Miller, Purcell
G. F. Smith, Purcell
Henry A. Good, Quincey
Neversink Planing Mill, Reading
Northeastern Planing Mill Co., Reading
Philadelphia & Reading Railway Co., Reading
Sheeder Planing Mill Co., Reading
C. C. Blerly, Rebersburg
D. J. Rumbel, Red Hill
Noah C. Stabler, Red Lion
Joseph M. Young & Co., Reedsville
Isaac H. Lebo, Reinholds Station R. D.
Phillip Reitz, Reitz
L. D. Stine, Reitz R. D.
G. D. Dubarry & Co., 41st St. & A. V. Ry.,
Pittsburgh
Eller Lumber & Mill Co., So. 23rd St., Pitts-
burgh
Henry J. Frey, Kaiser & Haslage Aves., Pitts-
burgh
Green & Evans Lumber Co., Ltd., 107 Warring-
ton Ave., Pittsburgh
Jacob Haney, 912 Lincoln St., Pittsburgh
R. W. Hare, 632 Penn Ave., Pittsburgh
L. J. Higgins Lumber Co., 33rd & Liberty Ave.,
Pittsburgh
Edwin M. Hill, 2601 Penn Ave., Pittsburgh
Interior Finish Co., Beaver Ave. & Fayette St.,
Pittsburgh
T. W. Jones, 2603 Penn Ave., Pittsburgh
The Keystone Lumber Co., S. 17th & Merriman
Sts., Pittsburgh
R. A. McCaJ Lumber Co., Putnam near Franks-
town Ave., Pittsburgh
Frank McFeeley, 520 W. Reliance St., Pitts-
burgh
The May Lumber Co., 1201 Irwin Ave., Pitts-
burgh
George B. Monks, 8-12 Ketchum St., N. S.,
Pittsburgh
North Avenue Stair Co., 809 North Ave., N. S.,
Pittsburgh
Pittsburgh & Lake Erie R. R., Pittsburgh
Pennsylvania Door and Sash Co., 900 Second Ave.,
Pittsburgh
Phoenix Glass Co., P. O. Box 757, Pittsburgh
A. F. Schwerdt Manufacturing Co., 145 McClure
Ave., N. S., Pittsburgh
M. Simon's Sons, 121-127 Anderson St., N. S.,
Pittsburgh
H. R. Walter Lumber Co., Fayette & Manhattan
Aves., Pittsburgh
Wigman Lumber Co., S. 18th & Wharton St.,
Pittsburgh
Young & Schmidt, 3209 Carson St., Pittsburgh

PLANING MILL PRODUCTS—Continued

H. P. Raup & Sons, Shamokin
Shamokin Lumber Manufacturing Co., Shamokin
W. G. Berkey, Shanksville
Walker & Lowry, Shanksville
Chas. C. Baker, Sharon
John Cook & Son, Sharon
Idine Cook & Son, Sharon
J. M. Hoagland & Co., Sharon
Wallis & Carley Co., Sharon
A. Wishart & Sons Co., Sharon
C. C. Weaver, Sharon
Rixby & Son, Sharon Center
E. L. Gaines & Son, Sharpsville
Frank W. Wiley, Sheakleyville
G. R. Wood's Sons Co., Sheffield
Shickshinny Lumber Co., Shickshinny
D. B. Becker Planing Mill, Shillington
Builders Home Supply Co., Shinglehouse
W. S. Snook, Shippensburg
J. P. Kilmer & Son, Shunk
C. F. Schulze, Silver Creek
John H. Glassmyer, Sinking Spring
L. L. Texter, Sligo
W. J. Ruble, Ruble Mills, Smithfield P. O.
C. W. Mitchell, Snedekerville
Berkebile Lumber Co., Somerset
Globe Column & Mfg. Co., Somerset
Somerset Door & Column Co., Somerset
Somerset Lumber Co., Somerset
Hemling & Son, Souderton
Brown-Borick Lumber Co., South Bethlehem
Robert Pfeifle, South Bethlehem
Perry Gilpin, South Sterling
Geo. H. Lancaster, South Sterling
D. H. Deaner, Springhope
C. P. Long, Spring Mills
Steelton Planing Mill, Steelton
Stewartstown Lumber & Mfg. Co., Stewartstown
John T. Long, Summerhill
Andrew Breslin, Summithill
Tilman Hontz, Summithill
Malick & Erdman, Sunbury
Sunbury Planing Mill Co., Sunbury
Deakin & Ash, Susquehanna
J. B. Sykes, Sykesville
Henry Becker, Tamaqua
J. A. Schilke, Tamaqua
Hough & Leard Co., Ltd., Tarentum
The Tarentum Lbr. Co., Tarentum
E. H. Harman, Thompsonstown
Ben Leshner, Thompsonstown

Wilkes-Barre Branch Post Offices.

J. F. Seward & Co., Kingston, Wilkes-Barre
H. W. Ruggles, Luzerne, Wilkes-Barre
Frank L. Underwood, Luzerne, Wilkes-Barre
Twist & Hippensteel, Parsons, Wilkes-Barre
Hart Planing Mill Co., North Ave. & Pitt St.,
Wilkesburg (Br. P. O.) Pittsburgh
Dan'l Whitmore & Co., Wilkesburg (Br. P. O.)
Wilkesburg Stair & Mfg. Co., Wilkesburg
(Br. P. O.)
W. F. Youngk Co., Wilkesburg (Br. P. O.)
F. B. Sherman, Williamsburg
John Coleman, Williamsport
W. D. Crooks & Sons, Williamsport
Goertz Carving Co., Williamsport
Loyalsock Planing Mill Co., Williamsport
Simmons Wood Working Co., Williamsport
William Slack, Williamsport
Vallamont Bldg. & Planing Mill Co., Williams-
port

PLUMBERS' WOODWORK.

Westmoreland Lumber Co., Monessen
Standard Sanitary Mfg. Co., New Brighton
Hale & Kilburn Co., 18th & Lehigh Ave.,
Philadelphia
Sanitary Specialties Co., 1824 E. Clearfield St.,
Philadelphia
Smedley Bros. Co., Church & Tacony Sts.,
Frankford, Philadelphia
West York Furniture Mfg. Co., York

PRINTING MATERIAL.

The W. O. Hickok Mfg. Co., Harrisburg
Joseph Adams, 1226 N. Alden, Philadelphia
American Electrotype Co., 706 Market St.,
Philadelphia
American Type Founders, 17 and 19 S. Sixth St.,
Philadelphia
Chas. S. Belz Co., 14 and 16 S. 5th St.,
Philadelphia
Duncan & Co., 621 Commerce St., Philadelphia
Franklin Electrotype Co., 224 So. 5th St.,
Philadelphia
Gatchel & Manning, 6th & Chestnut Sts.,
Philadelphia
Hanson Brothers, 704 Sansom St., Philadelphia
Royal Electrotype Co., 620 Sansom St., Phila-
delphia
Henry H. Sheip Mfg. Co., N. E. Cor. 6th St.
& Columbia Ave., Philadelphia
Sheip & Vandergrift Co., 816 Lawrence St.,
Philadelphia
Weskott & Thompson, 112-114 N. 12th St.,
Philadelphia
Geo. W. White, 721 Walnut St., Philadelphia

PULLEYS AND CONVEYORS.

P. & R. R. R. Repair Shops, Catawissa
Edwards Mfg. Co., Laceyville
Eclipse Pulley Co., Meyersdale
Colditz-McMinn & Co., 702 W. Canal St.,
Philadelphia
W. W. Patterson Co., 54' Water St., Pittsburgh
Pittsburgh Block & Mfg. Co., 818 South Ave.,
North Side, Pittsburgh
Reading Wood Pulley Co., Reading
Bethlehem Steel Co., South Bethlehem

PUMPS.

Connellsville Mch. & Car Co., Connellsville
The Monongahela River Consolidated Coal and
Coke Co., 48 Market St., Pittsburgh
G. R. Wood's Sons Co., Sheffield
Standard Wood Pipe Co., Williamsport

REFRIGERATORS AND KITCHEN CABINETS.

J. D. Naftzinger, Centerport
Stevenson Co., Chester
Banta Refrigerator Co., Clearfield
R. F. Kleingina, Du Bois
W. H. Kelchner, Midwayville
J. Fisher and Co., 1216-18 N. 5th St., Phila-
delphia
Hale & Kilburn Co., 18th St. and Lehigh Ave.,
Philadelphia
John Knoell & Sons, 171 Jefferson St., Phila-
delphia
A. H. & F. H. Lippincott, Inc., 24th & Locust
Sts., Philadelphia
McCracken & Hall, 1120 Washington Ave.,
Philadelphia
Thos. Mills & Bro., Inc., 1301 N. 8th St.,
Philadelphia
Ridgway Refrigerator Co., 3519 N. Lawrence
St., Philadelphia
C. J. & A. Schad, 519 Bainbridge St., Phila-
delphia
H. Daniel Long, S. W. Cor. Front & Mont-
gomery Sts., Philadelphia
Standard Refrigerator Co., 2543-45-47 Germantown
Ave., Philadelphia
S. Delp's Sons, Fourth and Liberty Sts., Pitts-
burgh
Bernard Gloekler Co., 1127 Penn. Ave., Pitts-
burgh
The Specialty Mfg. Co., Titusville
H. A. Boyer, West Hanover

ROLLERS AND CURTAIN POLES.

Webb Mfg. Co., Brookville
Bernard McCurdy, 9th & Arch Sts., Phila-
delphia
Smedley Bros. Co., Church & Tacony Sts.,
Frankford, Philadelphia
Thomas Ott & Co., 1124-1132 Washington Ave.,
Philadelphia
R. M. Bowser & Son, Renfrew
Geo. H. Lancaster, South Sterling

SADDLES AND HARNESS.

Barton Mfg. Co., Ivyland
Eagle Scotch Hame Manufacturers, 235 No.
Lawrence St., Philadelphia
H. M. Easterbrook, 311 Cherry St., Philadelphia
Hessler Wagon Works, Inc., 557 E. Girard Ave.,
Philadelphia

SHIP AND BOAT BUILDING.

A. Long & Son, Albion
Rift Climbing Boat Co., Athens
Ray Hoffman, Bloomsburg
W. N. Foust & Son, Conneaut Lake
Hauser Bros., Delaware Water Gap
Dravosburg Dock Co., Dravosburg
Paasch Bros., Erie
John S. Sheppard, Essington
Harrisburg River, Coal, Sand & Stone Co.,
Harrisburg
Geo. V. Tompkins, Marcus Hook
The Lehigh Coal & Navigation Co., Mauch
Chunk
Collins, Darrach & Co., Nebraska
Wm. Cramp & Sons, Ship & Eng. Bldg. Co.,
Beach and Ball Sts., Philadelphia
William Glass & Son, 779 N. 28th St., Phila-
delphia
Wesley Glenn, S. L. Tacony St., Philadelphia
U. S. Navy Yard (Hull Division), Philadelphia
E. F. Ward & Sons, Philadelphia
Hazelwood Dock Co., Pittsburgh
The Monongahela River Consolidated Coal and
Coke Co., 8 Market St., Pittsburgh
Neville Dock Co., 1218 Park Building, Pitts-
burgh
R. C. Price & Co., Foot Federal St., Pitts-
burgh
James Rees & Sons Co., Pittsburgh
H. R. Walter Lbr. Co., Fayette & Manhattan
Aves., Pittsburgh
J. M. Samsel, Point Pleasant
Peck Lbr. Mfg. Co., Scranton
J. P. Coryell, Shamokin Dam
Bethlehem Steel Co., South Bethlehem
Forest Barge Co., Tionesta
U. S. Boat Yards, Lock No. 4
Douglass & Yale, Union Dale
Wyatt Stroman, Yorkhaven

SHUTTLES, SPOOLS, AND BOBBINS.

Allentown Robbin Works, Allentown
Allentown Reed, Harness & Mill Supply Co.,
Allentown
Clover Leaf Mfg. Co., Carbondale
Arnold & Bro., Coopersburg
Excelsior Robbin & Spool Co., Newtown
J. B. Brusher, Norristown
Jas. H. Billington & Co., Randolph & Jefferson
Sts., Philadelphia
B. R. Dover, 1126 N. Orianna, Philadelphia

SPORTING AND ATHLETIC GOODS.

A. C. Kelly, Center Moreland
Oneda Community, Ltd., Lititz
Clark Herd Mfg. Co., 2419 Front St., Phila-
delphia
Chas. P. Foulkrod, 2235 Wood St., Philadelphia
John Grass Wood Turning Co., 222 Vine St.,
Philadelphia
Frank Rosatto Co., 222 So. 8th St., Philadelphia
Geo. Wuerthele & Sons, 1724 East St., N. S.,
Pittsburgh
Wm. Wuerthele, 418 Diamond St., Pittsburgh
Geo. H. Rhea, Saltsburg
Holmes & Gilfillan, Smethport
Becker Novelty Co., Spring Creek
J. H. Park, Warren

TANKS AND SILOS.

Penn. R. R. Car Shops, Altoona
P. & R. Ry. Repair Shops, Catawissa
Downington Mfg. Co., Downington
Grater Body Co., Norristown
Amos H. Hall Son & Co., 2915-2933 N. Second
St., Philadelphia
E. F. Schlichter Co., 10 S. 18th St., Philadelphia
Woolford Wood Tank Mfg. Co., 1429 Chestnut
St., Philadelphia

H. Elssesser & Bros., 1324 Ohio St., N. S.,
Pittsburgh
Fleming Tank Co., 3115 Liberty Ave., Pitts-
burgh
H. R. Walter Lbr. Co., Fayette & Manhattan
Aves., Pittsburgh
Rouseville Supply Co., Rouseville
John Benore, Scranton
International Silo Co., Linesville
F. P. Case & Son, Troy

TOYS.

Standard Novelty Co., Duncannon
F. W. Crandall & Co., Elkland
Barton Mfg. Co., Ivyland
Benner Mfg. Co., Inc., Lancaster
Glen Mawr Novelty Works, Mawrglen.
Le Raysville Furn. & Mfg. Co., Le Raysville
Mansfield Novelty Works, Mansfield
L. Hopkins Mfg. Co., North Glard
S. L. Allen & Co., 5th St. and Glenwood Ave.,
Philadelphia
A. Schoenhut Co., 2215 Adams St., Philadelphia

J. T. Hammond & Son, Inc., 4534 Hedge St.,
Frankford, Philadelphia
A. Mecky Co., 1705 Allegheny Ave., Philadel-
phia
Penn. Wheelbarrow Co., 4741 Kansas St., Pitts-
burgh
Weaver Specialty Co., 6344 Aurelia St., E. E.,
Pittsburgh
Geo. H. Lancaster, South Sterling
Hawes Mfg. Co., Towanda
Keystone Farm Machine Co., York

TRUNKS AND VALISES.

Fiber Specialty Co., Kennett Square
S. J. Bailey, Nicholson
The Belber Trunk & Bag Co., 1641 N. Hancock
St., Philadelphia
S. Berkowitz, 1818 So. 9th St., Philadelphia
Robert McGuinn & Co., 437 Market St., Phila-
delphia

Cramer and Sherr, 123 So. 3rd St., Philadelphia
B. Podol, 1103 N. 2nd St., Philadelphia
J. H. Seltz & Son, 414 & 438 Brown St., Phila-
delphia
B. B. & B. Trunk Co., 32-40 Isabella St., Pitts-
burgh
South Montrose Mill Co., South Montrose

VEHICLES AND VEHICLE PARTS.

International Motor Co., Allentown
Est. of W. Wolf, Allentown
Lewis Wolf's Sons, Allentown
Balzer Koelle, Altoona
Russell Delozier, Altoona
Penn. R. R. Co. (Foundries), Altoona
Penn. R. R. Car Shops, Altoona
J. L. Saylor & Son, Annville
T. M. Werner, Annville
The Autocar Co., Ardmore
L. C. Brenner, Bainbridge
W. Ira Baker, Bakersville
W. G. Sterling, Bakerstown
Joseph Litterhouse, Bally
S. S. Lynch, Bausman
Jacob F. Schmitt, Beaver Meadows
J. O. Klinger, Beaver Springs
Bedford Planing Mill Co., Bedford
F. H. Brightbill, Bedford
A. G. Brightbill & Son, Bedford
W. S. Fletcher, Bedford
Isaac K. Meyer, Redminister
H. J. Horton & Co., Belleville
S. F. Appleman, Benton
Long Wagon Co., Benton
Wm. E. Gruber, Bernville R. D.
Gruber Wagon Works, Bernville R. D.
Trescott Carriage Works, Berwick
A. K. Huntzinger, Blainsport
Edw. Stevens, Bowmansdale
Boyetown Carriage Co., Boyertown
Pittsburgh Machine Tool Co., Braddock
C. A. Adams, Bridgeton R. D.
Chas. B. Sossong Co., Bridgeville
Standard Cast Iron Pipe & Foundry Co., Bristol
J. D. McSparrin, Brockwayville
Brookville Mfg. Co., Brookville
C. W. Scott Co., Bryn Mawr
A. F. Fey, Carbondale
H. J. & W. A. Krumenacker, Carrolltown
A. C. Kelly, Center Moreland
J. G. Reber, Centerport
C. H. Schantz, Center Valley
Walton Lumber Co., Charleroi
M. Ocheltree, Chester
S. M. Congleton, Chester Heights
Schaller Bros., Clark
Clearfield Novelty Works, Clearfield
R. H. Grater, Collegeville
Frank J. Bower, Collomsville
Columbia Wagon Co., Columbia
Coraopolis Mfg. Co., Coraopolis
F. E. Neffe, Condersport
Z. H. Markley, Cressman
John G. Stoll, Deodale

J. K. Hinkle, Dillsburg
Huston Irwin Mfg. Co., Du Bois
Hobson & Co., Easton
J. Monroe Young, Easton
St. Francis Industrial School, Eddington
C. Prouty & Co., Eldred
C. Bailey & Co., Elmsport
A. Buch's Sons Co., Elizabethtown
Martin & Heagy Mfg. Co., Elizabethtown
Swab Carriage Co., Elizabethtown
Swab Wagon Co., Elizabethtown
Horace Handwork, Elverson
Acme Wagon Co., Emigsville
J. H. Young Lumber Co., Emlenton
H. N. Thayer Co., Erie
W. C. Laderer, Evans City
F. M. Ott & Son, Everett
R. F. Beers, Fallentimber
S. A. Mowers, Fayetteville
Finleyville Planing Mill Co., Finleyville
Fleetwood Metal Body Co., Fleetwood
Myers Carriage Co., Franklin
A. Reynolds, Franklin
Fredonia Bending Works, Fredonia
R. M. Whitney, Galeton
M. Schults, Gallitzin
George T. Sellers, Gap
George Kelnard, Geigers Mills
D. W. Bryan, Gillett
J. N. Kramer, Goodville
Stoyers Carriage Shop, Greenville
Grim & Bro., Grinnville
F. C. Fehrman, Groffs Store
McKay Carriage Co., Grove City
Scott & Kemmerer, Hamburg
Hanover Bending & Mfg. Co., Hanover
Hopkins Mfg. Co., Hanover
Eureka Coal Wagon Co., Harrisburg
C. A. Fair Carriage & Auto Works, Harrisburg
C. A. Sefton Carriage Works, Harrisburg
C. E. Shaffer Est., Harrisburg
Penna. R. R. Co., Harrisburg
F. N. Watts, Harrisburg
Samuel Fahs, Highspire
Jas. B. Condron, Hollidaysburg
Penwarden Mfg. Co., Honesdale
Wm. Nelms, Honey Brook
Bowers & Leathers, Howard
Howard Handle & Spoke Co., Howard
Chas. E. Fletcher, Howard
M. Gillis, Hughesville
Conner Vehicle Co., Indiana
John F. Klein, Ironbridge
T. H. Hazlett Lbr. Co., Jeannette
C. H. Decker, Jersey Shore

VEHICLES AND VEHICLE PARTS—Continued.

Chas. Shoup, Jersey Shore
Conemaugh Lbr. Co., Johnstown
Ranch Handwork & Co., Jordan
American Road Machine Co., Kennett Square
Jacobs & Colley Wilkes-Barre, Kingston Br.
P. O.
H. W. Miller, Kittanning
H. Shaffer Lumber Co., Kittanning
E. R. Kroninger, Kutztown
R. Miller's Sons, Kutztown
Edwin A. Kauer, Kutztown
J. H. Kirk & Co., Kylertown
Roy M. Plank, Lampeter
Samuel E. Bailey, Lancaster
Downey Bros. Spoke & Bending Co., Lancaster
Edwin Edgerly, Lancaster
Michael Hoover, Lancaster
Stoll Bros., Lancaster
S. M. Skeen, Lancaster
John R. Cooper, Landenberg
Automatic Wagon & Truck Co., Lansdowne
Latrobe Carriage Co., Latrobe
Monyar Carriage Co., Latrobe
The Fauber Coach Works, Lebanon
A. F. Heim Carriage Works, Lenhartsville
T. L. Blocker & Sons, Littlestown
S. D. Mehring, Littlestown
Frank L. Underwood, Wilkes-Barre, Luzerne Br.
P. O.
N. F. Shillingford, McAllisterville
A. Mauser & Bro., McEwensville
L. Loeffler, McKeesport
Otto Sippel, McKees Rocks
J. W. Gerhard, Macungie
H. P. Frank, Maytown
Sload & Bro., Maytown
The Eberly & Orris Mfg. Co., Mechanicsburg
J. K. Hinkel, Mechanicsburg
J. B. Koller & Co., Mechanicsburg
Fred Seidel Estate, Mechanicsburg
Seidel & Hinkel, Mechanicsburg
Hopp Carriage Co., Millinburg
Millinburg Body & Gear Co., Millinburg.
D. B. Miller, Millinburg
Elmer C. Rudy, Millinburg
Potter Wagon Works, Millintown
Charles S. Pearson, Milford
Edward Buck, Millville
John Eves & Co., Millville
Valley Machine & Turning Co., Monongahela
J. Howard Ames, Morgantown
Wm. H. Albright, Mount Penn
Mountville Mfg. Co., Mountville
Jacob M. Ames, Neffsville
C. H. Felten, New Baltimore
Darlington & Hoffman, New Bloomfield
B. S. Struckman, New Buena Vista
Shenango Lumber Co., New Castle
H. A. Buffenmyer, New Holland
Graff & Weaver, New Holland
Wm. Huntley, New Milford
C. H. Mathews, Newportville
Clarence Randall, Newtown
McGowan & Heuscher, Newtown
Horace Ervien, Ogontz
Harry Williams & Son, Ogontz
Eagle Spoke Works, Oil City
Kramer Wagon Co., Oil City
J. W. Connor, Orangeville
S. B. Wise Sons, Orrstown
Johnson Carriage Co., Oxford
Wilson Bros., Oxford
Martz & Fisher, Paxinos
J. G. Moyer & Sons Co., Perkaskie
Max M. Betz & Son, 1041 Frankford Ave., Phila-
delphia
Bloch Go-Cart Co., 1136-48 N. American St.,
Philadelphia
The John Buckley Hub, Spoke & Wheel Co.,
969-75 N. 2nd St., Philadelphia
J. Haynes Caffrey, 1712 Fairmount Ave., Phila-
delphia
Finnesey & Kobler, Inc., S. W. Cor. 26th &
Parrish Sts., Philadelphia
Fulton-Walker Co., 1931 Filbert St., Phila-
delphia
Geo. W. Garrett & Sons, 39th & Lancaster Ave.,
Philadelphia
Hale and Kilburn Co., 18th St. & Lehigh Ave.,
Philadelphia
H. Kaiser & Co., Inc., 23rd & Race Sts.,
Philadelphia
Kessler Wagon Works, Inc., 857 E. Girard Ave.,
Philadelphia

Morris Truck & Wheel Co., 2016 S. Bancroft St.,
Philadelphia
Louis Oehme, 3045 Richmond St., Philadelphia
Peizelt & Keyser, N. E. Cor. 24th & Locust,
Philadelphia
Pennsylvania R. R. (West Phila. Shops), Phila-
delphia
Rech-Marbaker Co., Eight St. & Girard Ave.,
Philadelphia
Rodenhausen's Excelsior Wagon Wks., 1437
Hutchinson St., Philadelphia
Frank Schanz, 408 N. Randolph St., Philadelphia
The Schwarz Wheel Co., Margaret St., & P. R.
R., Philadelphia
Southwork Truck Co., 911-913 Ellsworth, Phila-
delphia
Sowney Bros., 1204 & 22 Frankford Ave., Phila-
delphia
Martin H. Walrath, Broad & Cambria, Phila-
delphia
Wm. Wenkenbach's Sons, 1310 Germantown Ave.,
Philadelphia
C. F. Bunting & Bros., Pillow
Jno. Deisenroth, 48 8th St., Pittsburgh
Doehle Wagon Co., 1055 Ohio St., Pittsburgh
Eagle Transfer Co., 101 Galveston Ave., Pitts-
burgh
Geo. J. Elsenhauer, 220 Brighton Road, Pitts-
burgh
H. J. Evans, 314-315 E. Reliance St., Pittsburgh
Frazier & Foltz, 2614 Smallman St., Pittsburgh
L. Glesenkamp Sons & Co., 320 Penn. Ave.,
Pittsburgh
R. J. Hayden, 4110 Liberty Ave., Pittsburgh
Wm. L. Heusel Wagon Co., 1st & Middle St.,
N. S., Pittsburgh
W. J. Hittner, 3402 Penn. Ave., Pittsburgh
Jno. H. Huy's Sons, Basin & Welsler Sts.,
Ewalt Station, Pittsburgh
Lewis Kaufman, 1206 East St., Pittsburgh
Kholes Wagon Co., 2213 Forbes St., Pittsburgh
H. Lange Wagon Co., 504 Second Ave. &
S. St. Clair St., Pittsburgh
W. H. Leonhard & Son, 218 43rd St., Pittsburgh
H. Linde, So. 24th & Sidney, Pittsburgh
McClinton & Co., 309 Sandusky St., Pittsburgh
Metz & Miller, 813 Penn. Ave., Pittsburgh
Monongahela River Consolidated Coal & Coke
Co., No. 8 Market St., Pittsburgh
Penn. Wheelbarrow Co., 4741 Kansas St., Pitts-
burgh
John Sauter, 411 Duquesne Way, Pittsburgh
G. A. Schnabel & Sons, 3069 Penn. Ave., Pitts-
burgh
Frank Sismour, 884 Main St., Pittsburgh
E. J. Thompson Co., Louisa St., Pittsburgh
H. R. Walter Lumber Co., Fayette & Manhattan
Ave., Pittsburgh
J. G. Weir & Son, 1325 Liberty St., Pittsburgh
C. West & Co., 420 Duquesne Way, Pittsburgh
Wilkinsburg Carriage Works, 500 Penn. Ave.,
Wilkinsburg, Pittsburgh
F. F. Childs, Pittsfield
H. N. Tritmeyer, Pleasant Gap
H. W. Millard, Pomeroy
Pennsylvania R. R. Co., Pottsville
P. McKean Harl & Son, Lindsay Sta., Punxsu-
tawney
Punxsutawney Fdy. & Mach. Co., Punxsutawney
Anchor Bending Works, Reading
Biehl's Carriage & Wagon Works, Reading
Keystone Vehicle Co., Reading
The S. G. V. Co., Reading
Wetherhold & Bros., Reading
Harvey S. Smith, Rebeck
D. J. Rumbel, Red Hill
Alvin Fauth, Red Lion
Noah C. Stables, Red Lion
J. & H. C. Dieble, Reynoldsville.
Schrock Bros., Rockwood
Levi Hackerty, Rohrertstown
L. D. Fields, Roxbury
G. W. Huber, Rural Valley
McKelvey & Peters, Rural Valley
E. C. Beckley, Saint Clairsville
John Benore, Scranton
Blume Wagon Works, Scranton
A. R. Gould & Sons, Scranton
Mason & Snowdon Lbr. Co., Scranton
Steup Bros., Sewickley
Frank K. Morgan, Shamokin
Shamokin Wagon Works, Shamokin
J. M. Hoagland & Co., Sharon
E. M. Seyfert, Shartlesville

VEHICLES AND VEHICLE PARTS—Continued.

W. E. Sell, Shelocta
The Parker Mfg. Co., Souderton
L. Hammond, Spangler
The Graves & Eighmy Co., Springboro
Kramer & Son, Springboro
Ephraim Fluck, Springtown
Albert Miller & Co., Springtown
A. D. Shollenberger, Steinsville
F. B. Hess, Stockertown
Levi Raezer, Talmage
Christ & Becker, Tamaqua
Eagle Carriage Works, Tamaqua
The Tarentum Lbr. Co., Tarentum
Martin Hub Works, Tidioute
J. C. Scowden, Tionesta
Titusville Handle Co., Titusville
J. F. Cupp, Trout Run
Fred Calfisch, Union City
The Star Handle Co., Union City
J. M. Howard & Son, Uniontown
Thos. Matthews, Uniontown
G. W. Baum, Urban
J. M. Davis, Walnut Bottom
Samuel Peterson, Warren

John S. Pross, Warrington
Hoopes Bro. & Darlington, Inc., West Chester
Jacobs & Colley, Kingston, Wilkes-Barre
Frank L. Underwood, Luzerne, Wilkes-Barre
Wilkinsburg Carriage Works, 500 Penn. Ave.,
Pittsburgh, Wilkinsburg Br. P. O.
Loyalsock Planing Mill Co., Williamsport
J. L. Rush & Son, Willow Grove
Willow Grove Bending Co., Willow Grove
J. R. Barnhart, Worthington
A. D. Benton, Worthington
John F. Stephens, Woodbine R. D.
Werner & Lesher, Yeagertown
W. A. Eberly Wheel Works, York
Eureka Bending & Wheel Works, York
A. B. Farquhar Co., York
Hoover Wagon Co., York
The Martin Carriage Works, York
Ness Bros. & Co., York
Pullman Motor Car Co., York
Ervin Smith & Co., York
York Carriage Co., York
York Wagon Gear Co., York

WEIGHING APPARATUS.

Penn. R. R. Car Shops, Altoona
Penn. R. R. Co. (Juniata Shops), Altoona
Louis Kirchgraber, 613-15 Cherry St., Philadelphia
The Standard Scale & Supply Co., 243 Water St., Pittsburgh.

WHIPS, CANES, AND UMBRELLA STICKS.

Chicora Whip Co., Ltd., Chicora
T. H. Gilpin, Greentown
Laanna Mfg. Co., Laanna
Wm. G. Bayha, 333-35 N. Fourth St., Philadelphia
James S. Caterson, 1136 Catherine St., Philadelphia
M. Horwitz, 305 Montrose St., Philadelphia
The Harvey V. Watt Co., 1804-26 E. Venango St., Philadelphia
L. Schneider Co., 4701 Worth St., Frankford
L. Silverstone & Co., 1126 N. Orianna St., Philadelphia
Geo. H. Lancaster, South Sterling
Wells Whip Co., Wellsville

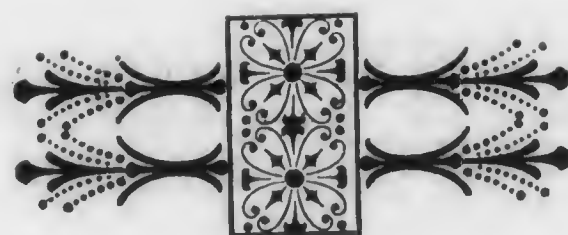
WOODENWARE AND NOVELTIES.

Keystone Mfg. Co., Albion
Allentown Reed Harness & Mill Supply Co., Allentown
The Belmer Mfg. Co., Canton
The H. Sheldon Mfg. Co., Canton
Catawissa Specialty & Mfg. Co., Catawissa
Clearfield Woodenware Co., Inc., Clearfield
Corry Pail Co., Corry
F. E. Westley, Corry
East Greenville Mfg. Co., East Greenville
C. Prouty & Co., Eldred
Lovell Mfg. Co., Erie
Hanover Bending and Mfg. Co., Hanover
Laanna Mfg. Co., Laanna
E. H. Alpha, Lakeville
Onelda Community Ltd., Lititz
Glen Mawr Novelty Works, Mawrglen
Norris Pattern & Machine Co., Norristown
The Eclipse Co., North Girard
The Empire Co., North Girard
Penn Mfg. Co., North Girard
John C. Dettra & Co., Oaks
John P. Little Co., Piteure Rocks
Nathan Cohen, 1126 N. Orianna St., Philadelphia
John Grass Wood Turning Co., 222 Vine St., Philadelphia
J. T. Hammond & Sons, Inc., 4534 Hedge St., Frankford, Philadelphia
Kassell & Co., 309 Montrose St., Philadelphia
John Klett, 1305 N. 27th St., Philadelphia
Thomas Ott & Co., 1124 Washington Ave., Philadelphia
L. Silverstone & Co., 1126 N. Orianna, Philadelphia
Geo. H. Lancaster, South Sterling
W. S. Wilcox, Turnersville, Jamestown P. O.
Blasdel Novelty Mfg. Co., Towanda
Patterson Bros. Co., Wellsboro
H. W. White, Whites Valley
F. B. Sherman, Williamsburg
W. John Stevens, Inc., Wyncote
Keystone Farm Machine Co., York

MISCELLANEOUS.

Pennsylvania Match Co., Bellefonte, Matches
Fred Fear Match Co., Bloomsburg, Matches
Coraopolis Mfg. Co., Coraopolis, Signs and Supplies
Penna. Hub & Veneer Co., Laquin, Brewers' Chips
Bernard McCurdy, Philadelphia, Flag and Tent Poles
Heilprin Mfg. Co., Philadelphia, Firearms
John Grass Wood Turning Co., Philadelphia, Bungs and Faucets
A. H. Fox Gun Co., Philadelphia, Firearms
Geo. H. Lancaster, South Sterling, Flag Poles and Staffs
F. B. Sherman, Williamsburg, Firearms

APPENDIX



ROUGH FOREST PRODUCTS.

It was pointed out on a preceding page that this study does not include the rough lumber produced by the Pennsylvania sawmills, nor the State's output of shingles, lath, cooperage, wood distillation, veneer, pulpwood, etc. The Bureau of the Census, co-operating with the Forest Service, yearly collects statistics for these commodities and in order to make this report complete in all phases of wood consumption, the census figures have been copied from the latest bulletins, 1911-12, in so far as they relate to Pennsylvania, and are presented in tabular form in the following paragraphs.

LUMBER.

In the production of chestnut lumber, Pennsylvania is second among the states, and third in the cut of hemlock, maple, and beech. The following table shows 22 woods cut in the State in 1912, arranged according to quantity, together with the average price per M feet at the mill and the total cost.

Table a.—Production of Rough Lumber.

Kind of Wood.	Quantity cut—Ft. b. m.	Average price per 1,000 ft.*	Total price.
Hemlock,	386,188,000	\$15 41	\$5,951,157
Oak,	209,473,000	19 52	4,088,913
Chestnut,	93,294,000	16 29	1,519,769
Maple,	81,617,000	16 19	1,321,379
White pine,	71,870,000	21 33	1,532,987
Beech,	40,682,000	15 64	628,031
Yellow pine,	21,647,000	13 87	300,244
Birch,	17,666,000	16 72	295,376
Yellow poplar,	14,413,000	22 75	327,896
Basswood,	10,925,000	18 67	203,970
Ash,	10,336,000	20 55	201,924
Hickory,	9,826,000	21 86	225,945
Elm,	2,994,000	16 67	49,910
Walnut,	2,268,000	21 47	48,694
Red gum,	1,454,000	12 47	18,131
Cedar,	892,000	14 40	12,845
Sycamore,	575,000	13 87	7,975
Spruce,	342,000	17 30	5,917
Balsam fir,	141,000	13 42	1,892
Tupelo,	100,000	13 90	1,390
Larch,	76,000	13 29	1,010
Cottonwood,	46,000	18 12	834
All others,	6,351,000	18 50	117,494
Total,	992,180,000	\$17 00	\$16,863,673

*Prices supplied from information in files of the Forest Service for prices f. o. b. mill.

LATHS.

Many of the plastering laths produced in Pennsylvania are produced from sawmill waste. Large quantities are also manufactured by portable lath mills that follow the sawmill onto cut-over tracts and clear up the remaining small softwood and the soft hardwood trees, as well as utilize the cutoffs, crooked logs, tops, and other material the lumbermen left in the woods. Hemlock and white pine are the principal lath woods in Pennsylvania, although spruce, yellow poplar, cucumber, and aspen were also reported.

SHINGLES.

Chestnut, because it is a durable wood outside and cheap, is the principal shingle material in Pennsylvania. White pine, hemlock, and a few hardwoods in small amounts were the other woods to contribute to the output. In the production of shingles Pennsylvania is not one of the principal states, but compared with the quantity of wood used by the various wood-using industries of the State and especially with the home-grown material reported, it is of considerable importance. Shingles made in Pennsylvania are both split and sawed, the sawed shingle is more salable and therefore, the kind generally manufactured.

Table b.—Production of Laths and Shingles.

Products.	Quantity.	Equivalent total feet b. m.
Laths,	78,758,000	15,752,000
Shingles,	26,967,000	2,696,000

COOPERAGE.

Table "c" reports the quantity and cost of material used in Pennsylvania for the manufacture of barrel stock, staves, and heading. Raw material for both stave and heading is usually purchased in the form of bolts but considerable sawmill waste is saved by being converted into these products. The prices given were not taken from the Census bulletin as they are not comprised in these statistics. Information concerning them was collected from cooperage plants by agents when in the field in connection with the wood-using industry investigation, and an average made of them and applied to the Census figures.

The manufacture of cooperage is an industry which rightfully comes within the scope of the wood-using industry study because both staves and heading are but knocked-down barrels and should be included the same as box shooks or other manufactured material which needs only to be assembled to be finished. However, owing to the fact that one Bureau of the Federal Government gathers these statistics, the Forest Service did not deem it expedient to seek similar information from the cooperage plants twice in the same year. Had the cooperage data been included in the foregoing report,

this industry, according to quantity consumed, would have stood fourth in the list of over 51 industries in Table 3. Thirteen woods are demanded each year for staves and heading. They are shown in the order of amounts as follows:

Table c.—Production of Cooperage Stock.

Kind of Wood.	Number of staves.	Sets of heading.	Equivalent total quantity raw material required ft. b. m.	Average cost per 1,000 ft., bolt form.	Total cost.
Beech,	78,588,000	2,347,000	85,082,700	\$7 00	\$595,579
Chestnut,	46,186,000	3,545,000	71,079,252	6 00	426,476
Maple,	22,108,000	1,715,000	34,199,916	7 00	239,399
Blrch,	10,367,000	231,000	10,458,756	6 50	67,982
Pine,	7,957,000	1,773,000	23,556,780	7 00	164,897
Oak,	1,972,000	.....	1,561,824	6 00	9,371
Red gum,	414,000	77,000	1,077,252	7 75	8,349
Spruce,	200,000	.....	158,400	6 50	1,080
Ash,	146,000	7,000	183,756	6 50	1,194
Elm,	105,000	3,600	112,356	7 00	786
Yellow poplar,	47,000	55,000	572,484	6 50	3,721
Basswood,	37,000	196,000	1,938,776	7 00	13,557
All others,	437,000	.....	346,104	6 15	2,129
Total,	168,564,000	9,949,000	230,326,356	\$6 66	\$1,534,470

PULPWOOD.

The quantity of wood consumed for making paper pulp in Pennsylvania, according to the 1911 Census figures, amounts to over 315,000 cords. It is procured in bolt form and is equivalent to more than 158,000,000 board measure feet that is annually taken from the forests of the State. Pennsylvania is the fifth State in the consumption of wood pulp and stands next to Maine in using large quantities of mill and woods waste in this line of manufacture.

Table d.—Pulpwood Consumption.

Kind of Wood.	Cords.	Equivalent total ft. b. m.
Spruce,	56,213	28,121,500
Pine,	51,265	25,632,500
Beech,	44,320	22,160,000
Yellow poplar,	35,120	17,560,000
Hemlock,	33,181	16,590,500
Maple,	30,874	15,437,000
All others,	10,265	5,147,500
Slab wood and other mill waste,	54,384	27,192,000
Total,	315,682	157,841,000

HARDWOOD DISTILLATION.

Beech, birch, and maple are the principal woods consumed in hardwood distillation. They have been separated in the following table merely to emphasize the kinds used and the quantities are not representative of the actual results but were arbitrarily divided in equal amounts for the want of more definite information. Besides the above named woods, oaks, hickory, chestnut, elm, and ashes were also consumed but in small quantities only. Pennsylvania hardwood distillation plants generally employ the destructive process. Charcoal, crude wood alcohol, and gray acetate are the principal products.

Table e.—Hardwood Distillation.

Kind of Wood.	Cords.	Equivalent total ft. b. m.
Beech,	121,513	60,756,500
Birch,	121,513	60,756,500
Maple,	121,513	60,756,500
Total,	364,539	182,269,500

VENEER.

Over 2,500,000 feet of logs in Pennsylvania were converted into veneer in 1911. These are not necessarily cut from the forests of the State as veneer logs are sought after over a wide territory and are imported from foreign countries and manufactured into veneer by mills in easy reach of important markets. In Pennsylvania maple was the principal wood consumed, followed by beech, yellow poplar, basswood, oak, birch, and cherry, in the order named. Spanish cedar was the only foreign wood.

END OF NUMBER.